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DAVID W. TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER

Bethesda, Md. 20084

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EXPERIMENTAL DETERMINATION OF TWO COMPONENTS OF FIELD POINT VELOCITIES AROUND A MODEL PROPELLER IN UNIFORM AND INCLINED FLOW

by

N. Santelli, J. Libby

M. Jeffers

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SHIP PERFORMANCE DEPARTMENT

FEBRUARY 1980 DTNSRDC/SPD/0921-01

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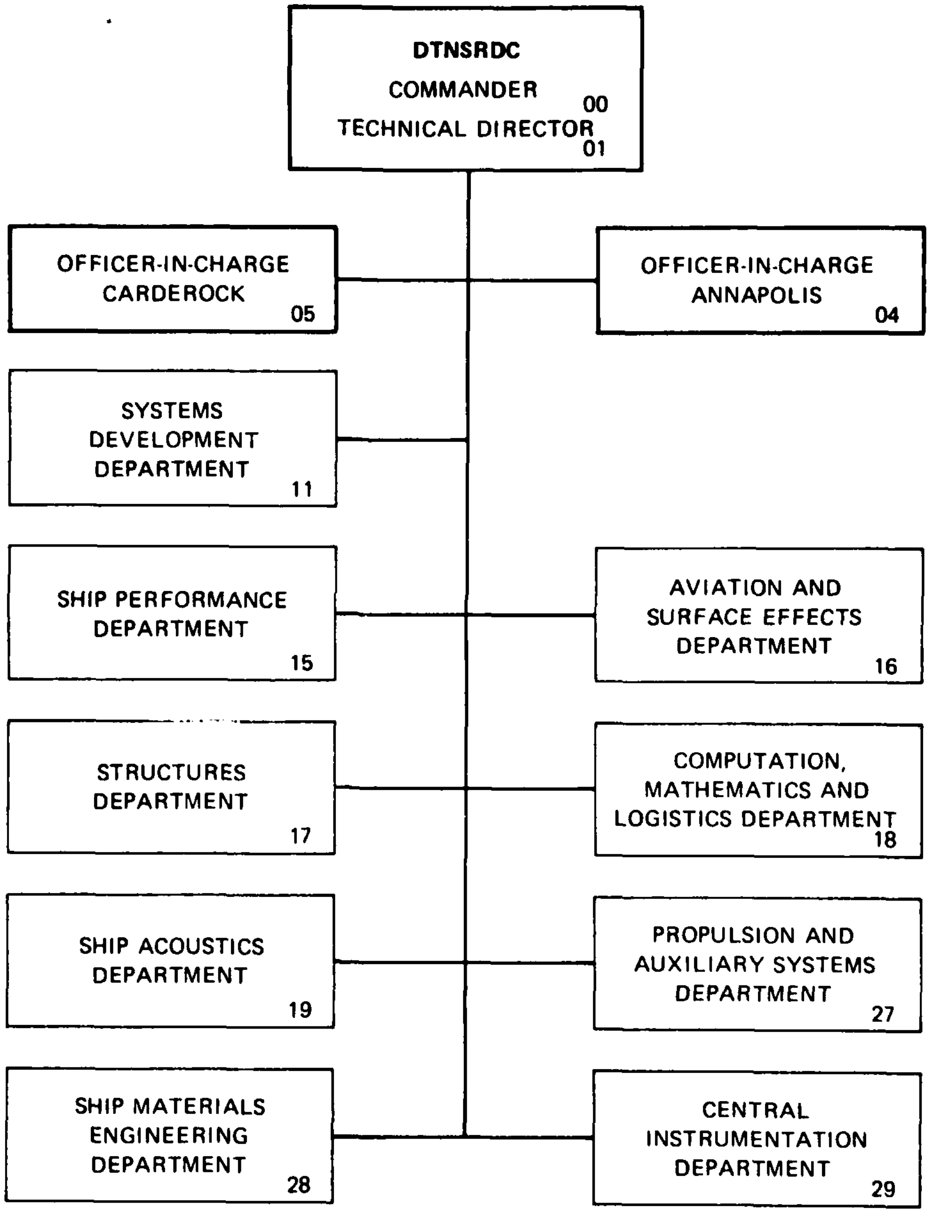
MAJOR DTNSRDC ORGANIZATIONAL COMPONENTS



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Measurements of two component velocity profiles were taken around model propellers, utilizing a laser doppler anemometer. Measurements were made with the propeller shaft parallel to the flow and at 20 degrees to the incoming flow. Both time averaged and blade angular-position-dependent data are presented in a manner that will aid in the evaluation of the various predictive theories of field point velocities around propellers.

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NOTATION

c	Chord length at 0.7 radius
D	Propeller diameter
D_n	Hub diameter
E_t	Half-thickness ordinate of blade function
f	Meanline ordinate of blade function
f_n	Camber of propeller blade section
J	Advance coefficient,
n	Propeller revolutions per unit time
R	Radius of propeller
Rn	Reynolds number
r	Radial coordinant from propeller axis
t	Maximum thickness of propeller blade section
V	Velocity
V_o	Freestream velocity
X, Y	Coordinate axis
Z	Number of blades
Z_R	Rake of propeller blade section measured from the propeller plane to the generator line, positive aft

Θ_s Skew angle measured from spindle axis to projection of blade section midchord into propeller plane, positive toward trailing edge

ν Kinematic viscosity of water

ρ Mass density of water

LIST OF ABBREVIATIONS

CP Controllable Pitch

DTNSRDC David W. Taylor Naval Ship Research and Developement Center

LDA Laser Doppler Anemometer

ABSTRACT

Measurements of two component velocity profiles were taken around model propellers utilizing a laser doppler anemometer. Measurements were made with the propeller shaft parallel to the flow and at 20 degrees to the incoming flow. Both time average and blade angular-position dependent data are presented in a manner that will aid in the evaluation of the various predictive theories of field point velocities around propellers.

ADMINISTRATIVE INFORMATION

The investigation described herein was funded by the Naval Sea Systems Command (NAVSEA 05R), Task Area S0379-SL001, Task 19977. The work was performed under David W. Taylor Naval Ship Research and Development Center Work Unit No. 1-1544-296.

INTRODUCTION

A great deal of interest exists in the ability to accurately predict field point velocities around propellers in inclined flow. Several theories, including some rather sophisticated refinements of the basic lifting surface theory, exist. However, these theories consistently under-predict the unsteady and time average blade loads[1] in inclined flow. Until very recently, the ability to evaluate the various theories has been hindered by a lack of detailed experimental velocity field data. This is due to the severe limitations of conventional pressure and thermal measuring techniques. Laser Doppler Anemometry (LDA), while having some drawbacks, does overcome many of the limitations suffered

by conventional probes. A few investigators, notably Min,[1] have successfully used LDA to obtain field point velocities around propellers.

This report describes an experimental investigation of two components of field point velocities around two model propellers. The experiment was conducted in the DTNSRDC 24-inch variable pressure water tunnel utilizing LDA. (The DTNSRDC LDA and data collection system are described in some detail in Appendix A.)

The propellers are mirror-images of one another; DTNSRDC propeller model No. 4710 is right hand rotation and DTNSRDC model No. 4711 is left-hand rotation. Only one propeller was tested at a time, but for reasons explained later, the use of two propellers allowed a more complete mapping of the flow field. The longitudinal and vertical components of velocity vs. blade angular position and the respective RMS resultant velocity vs. blade angular position are presented in detail. Tabulated values of the velocity vs. blade angular position are included in Appendix B. A brief discussion of the models and facility is included.

No attempt is made here to exploit the LDA data presented. Correlations of the data with theoretical predictions will be done in a separate report.

EXPERIMENTAL COMPONENTS

THE LDA

The body of literature on LDA is extensive, with over one thousand papers and several books having been published on the subject in the last decade. For a general discussion of the LDA technique and its inherent

advantages and limitations, the reader is referred to Min[2], Yanta[3], and Durst.[4]

The DTNSRDC LDA system was utilized to obtain field point velocities in the present investigation. Appendix A contains a detailed description of the DTNSRDC LDA system and the data collection system used in this investigation. This system has the capability of measuring the time dependent longitudinal and vertical velocity components as referenced to the tunnel test section (see Fig. 1a). A back scatter mode of operation was used to obtain time-average data, and a forward scatter mode was used to obtain time-dependent data (see Appendix A). Velocity profiles were taken upstream and downstream, above and below the propeller. Time dependent data could not be taken in the horizontal plane passing through the propeller shaft due to the blockage of the laser beams by the propeller shaft in the forward scatter mode.

Figure 1a is a schematic of the propeller in the inclined position. The coordinates of the data collection locations were referenced to the propeller center (X-Y axis). This data was later resolved along the shaft axis and perpendicular to the shaft axis (primed coordinates).

An LDA system was chosen for the velocity measurements because of its advantages over conventional thermal and pressure probes. Specifically, the LDA can be used to obtain time-dependent data while pressure probes, because of their very slow response to velocity fluctuations, cannot be used for such measurements. Unlike thermal probes the LDA can obtain data directly in front of the propeller

disk and does not require frequent recalibration. In addition, the LDA has better spatial resolution than two component thermal probes. Unfortunately, optical considerations, complexity, and high cost preclude the use of LDA in routine experimental investigations. A discussion of the accuracy of the DTNSRDC LDA system is included in Appendix A.

EXPERIMENTAL FACILITY

The experiment was conducted in the DTNSRDC 24 inch variable pressure water tunnel.[5] This tunnel is a closed circuit tunnel equipped with a 60.96 cm (24 in) diameter open jet test section. The maximum water velocity through the test section is 18 m/sec (59 ft/sec), and the static pressure at the test section centerline can be varied from 5.85 to 99.58 kg/cm (2 to 34 psi). Tunnel velocity was determined by a pitot tube suspended from the top of the test section slightly in front of the test position of the propeller. Both upstream and downstream shafts are available. For the 0-degree angle of attack portion of this experiment the downstream shaft was used. A right angle drive unit, mounted in the top of the tunnel test section was used for the inclined portion of the experiment. (Fig. 1a)

The tunnel has a filtration system which normally filters out particles larger than 25 microns; however, just prior to this experiment 3 micron filters were installed.

Figure 1a shows the orientation of the right angle drive and propeller model in the water tunnel. The propeller shaft is inclined 20 degrees to the mean flow. The longitudinal and vertical velocity

components were measured relative to the tunnel axis.

PROPELLER MODELS

DTNSRDC propellers No. 4710 and 4711 (Fig. 2) were selected for this investigation. These propellers are models of a four bladed controllable pitch propeller currently in use on the RV Athena (PG-84), and are 22.17 cm. (8.728 in.) in diameter. They are identical except that 4710 is right hand rotation and 4711 is left hand rotation. The models were manufactured of aluminum and are anodized black.

Table 1 gives the propeller characteristics. Figure 3 shows a schematic drawing of the propeller.

The use of two such propellers allowed a more complete mapping of the flow field while allowing the laser to remain on the same side of the water tunnel.

Prior to the experiment, thrust and torque measurements were made in the 24-inch tunnel and the results compared with open water data. These data are presented in Reference 1, which includes complete tunnel and open water data on these propeller models.

TABLE 1 - CHARACTERISTICS OF CP PROPELLERS ON R/V ATHENA (PG-84 CLASS); DTNSRDC MODEL PROPELLERS 4710 AND 4711

Diameter, D: 6.0 feet (1.829 m)*

Number of Blades, Z: 4

Hub-Diameter Ratio, D_h/D: 0.312

Expanded Area Ratio: 0.775

Blade Thickness Fraction: 0.048

Section Meanline: NACA 65

Section Thickness Distribution: NAVSEC Type I

r/R	c/D	P/D	θ_s (deg)	Z_R/D	t/D	f_M/c
0.312	0.2154	1.020	-0.57	0.00	0.0336	0.0059
0.4	0.2986	1.061	2.32	0.00	0.0264	0.0149
0.5	0.3867	1.090	4.76	0.00	0.0194	0.0198
0.6	0.4650	1.107	6.59	0.00	0.0140	0.0203
0.7	0.5383	1.111	8.00	0.00	0.0100	0.0183
0.8	0.5717	1.103	9.11	0.00	0.0072	0.0153
0.9	0.5333	1.081	10.01	0.00	0.0056	0.0108
0.95	0.4667	1.065	10.40	0.00	0.0049	0.0079
1.0	0.00	1.047	10.75	0.00	0.00	–

*For model propeller, D = 0.7273 feet (0.2217 m)

TABLE 1 Cont.

y	f/f_m*	$2E_t/t$**
0.00	0.00	0.0654
0.0125	0.0494	0.2153
0.0250	0.0975	0.3010
0.05	0.19	0.4183
0.0750	0.2775	0.5053
0.10	0.36	0.5763
0.15	0.51	0.6890
0.20	0.64	0.7773
0.30	0.84	0.9030
0.40	0.96	0.9757
0.50	1.00	1.00
0.60	0.96	0.96
0.70	0.84	0.84
0.80	0.64	0.64
0.90	0.36	0.36
0.95	0.19	0.19
1.00	0.00	0.00

*NACA 65 meanline

**NAVSEC Type I Thickness Form

DATA PRESENTATION

During the investigation the advance ratio (J) was maintained at 0.86 for all of the time-dependent measurements and the tests were run at atmospheric pressure. The inclination of the right angle drive was 20 degrees to the mean flow for the initial portion of the experiment and 0-degrees for the remainder.

Figures 4 through 16 show the variation of the nondimensional, time dependent, longitudinal (x) and vertical (y) velocities with blade angular position for the inclined flow portion of the investigation. The velocities are nondimensionalized by the free stream tunnel velocity. These are computer generated graphs, where 'a' graphs show longitudinal velocity components and 'b' graphs show vertical velocity components. One example of an RMS velocity curve is given by Figure 4c. Positive longitudinal velocity is in the direction of the onset mean flow and positive vertical velocity is upward (see Figure 1b). All velocities and probe locations are referenced to the right-hand propeller model. The computer code automatically adjusts the scale of each graph to fit the data, so that the scale may change from figure to figure. All angular positions are referenced to 0 degrees at the leading edge of the blade at 0.7 radius. The leading edge at other radii occurs at a different degree mark and thus accounts for the slight offset in the velocity graphs from one radius to the next. The trailing edge at 0.7 radius occurs at 74-degrees.

For convenience Figure 17 shows three typical velocity curves, each in the same profile, but at a different radius. In the upper right hand corner of each figure, the term 0-, 90-, and 180-degrees refers to the position in the flow field from which a particular data set was obtained (refer to Figure 1c). For convenience, Table 2 groups the data sets according to measurement location and gives the table number in Appendix B of the corresponding numerical data table. The tare velocities, the average velocity obtained at the same position and free stream velocity, but with a dummy hub in place of the model propeller, are listed at the bottom of each numerical data table. The tare RMS velocities are also given; however, due to the accuracy limitations discussed in Appendix A, RMS readings of 0.013 or less cannot be considered reliable. Note that for the 90-degree positions (Figures 16 and 17) only axial data were obtained.

Figures 18 through 28 show the previously presented data resolved along the propeller shaft axis and in a radial direction, orthogonal to the shaft axis, (refer to Figure 1b). Tables B14 through B24 give the corresponding numerical data sets. Note that most of the above time-dependent data were taken above and below the propeller centerline (0-and 180-degrees). Only very limited time-dependent data could be taken in the horizontal plane of the propeller, specifically, only the longitudinal component at the 0.7 and 0.8 radii (Figures 15 and 16 repectively). However, additional longitudinal time-average data were taken at these positions in the backscatter mode of operation (see Appendix A). These data are presented in Figures 29 and 30.

TABLE 2 - DATA GROUPINGS AT SHAFT INCLINATION OF 20-DEGREES

Figure No.	Non-Dimensional Coordinates X	Y	Z	Position in Propeller Disk (Degrees)	Table No. of Corresponding Numerical Data
4a & 4b	-.43	.7	.00	180	B1
5a & 5b	-.43	.7	.00	0	B2
6a & 6b	.21	.7	.00	180	B3
7a & 7b	-.39	.5	.00	180	B4
8a & 8b	-.39	.8	.00	180	B5
9a & 9b	-.39	.9	.00	180	B6
10a & 10b	-.39	.5	.00	0	B7
11a & 11b	-.39	.8	.00	0	B8
12a & 12b	.21	.7	.00	0	B9
13a & 13b	.21	.8	.00	0	B10
14a & 14b	.21	.9	.00	0	B11
15	-.39	.7	.00	90	B12
16	-.39	.8	.00	90	B13
18a & 18b	-.43	.7	.00	180	B14
19a & 19b	-.43	.7	.00	0	B15
20a & 20b	.21	.7	.00	180	B16
21a & 21b	-.39	.5	.00	180	B17
22a & 22b	-.39	.8	.00	180	B18
23a & 23b	-.39	.9	.00	180	B19
24a & 24b	-.39	.5	.00	0	B20
25a & 25b	-.39	.8	.00	0	B21
26a & 26b	.21	.7	.00	0	B22
27a & 27b	.21	.8	.00	0	B23
28a & 28b	.21	.9	.00	0	B24

Figures 31 through 46 are graphs of the nondimensional, time-dependent variation of velocity and RMS velocity with blade angular position for the 0-degree shaft inclination portion of the investigation. For this configuration the measured longitudinal (x) and vertical (y) velocity components are parallel to and radially outward from the propeller shaft. Table 3 groups these data sets into profiles and gives the table number of the corresponding numerical data table. NOTE: A temporary malfunction caused the shaft to go out of synchronization with the computer (see Appendix A). Therefore the leading edge on the model propeller at 0.7 radius is the 49th degree on the velocity graphs and the corresponding numerical data tables.

Since the flow field in the 0-degree shaft inclination portion of the investigation is periodic over each 90 degrees, for convenience most of the data were taken along the 180-degree plane. Several check runs in different planes were made. Figure 37 shows data for a typical check run taken at 0.7 R along the 0-degree plane. This corresponds to Figure 40 along the 180-degree plane. Figure 46 shows data taken farther downstream of the propeller (0.62 R) than the other profiles.

Near the end of the experiment, numerous attempts were made to obtain tangential velocity component data by taking vertical (y) data along the 270-degree line. For reasons mentioned above and in Appendix A, this was not possible. Some limited vertical velocity component data were taken as close to the 90-degree line as possible. These data are presented in Figures 47 through 50. For these runs the synchronization malfunction was corrected, ie the leading edge of the

TABLE 3 - DATA GROUPINGS AT SHAFT INCLINATION OF ZERO DEGREES

Figure No.	Non-Dimensional Coordinates			Position in Propeller Disk Degrees	Table No. of Corresponding Numerical Data
	X	Y	Z		
31a & 31b	-.39	.5	.00	180	B25
32a	-.39	.7	.00	180	B26
33a & 33b	-.39	.8	.00	180	B27
34a & 34b	-.39	.9	.00	180	B28
35a & 35b	-.39	1.0	.00	180	B29
36a & 36b	-.399	1.1	.00	180	B30
37a & 37b	.21	.7	.00	0	B31
38b	.21	.4	.00	180	B32
39a & 39b	.21	.5	.00	180	B33
40a & 40b	.21	.7	.00	180	B34
41a & 41b	.21	.8	.00	180	B35
42a & 42b	.21	.9	.00	180	B36
43a & 43b	.21	1.1	.00	180	B37
44a & 44b	.21	1.0	.00	180	B38
45a & 45b	.21	1.22	.00	180	B39
46	-.62	.7	.00	180	B40
47	.21	-.33	.6		B41
48	.21	-.33	.7		B41
49	-.39	-.35	.6		B42
50	-.39	-.35	.7		B42

blade at the 0.7 radius is at the 0-degree position given in the graphs and the corresponding data tables.

DISCUSSION OF DATA

The figures clearly show the generally anticipated variations of velocity with blade angular position. These variations are quite similar to those observed by Min.[2] The increase in velocity at the blade leading edge (0-degrees at 0.7 radius), the reaching of a velocity maximum, and the fall off in velocity towards the trailing edge (74-degrees at 0.7 radius), is obvious and requires no further comment. For various reasons, however, some of the data sets do warrant individual consideration.

Some graphs of the longitudinal velocity show a rise in velocity at the trailing edge, then a dip in velocity just before the leading edge. This is most noticeable in Figures 8a, 9a, 12a, 25a, 26a, 32a, and 39a. The existence of these small dips is not generally predicted by lifting line theory. These same dips were noted by Min for all three DTNSRDC propeller models used in his investigation of field point velocities. After lengthy analysis Min concluded that these dips are velocity defects due to the blade boundary layer and wake.

Figures 40b and 42b appear to have severe scatter, but as previously mentioned, the computer automatically adjusts the graph scale. The very small absolute values of the data for these runs caused the scale to be 'blown up', greatly exaggerating the actual scatter.

The data shown in figures 43 through 45 were taken beyond one propeller radius. This is outside the propeller slipstream and the longitudinal velocity has decreased. Velocity fluctuations induced by the tip vortices result in the relatively high scatter and RMS velocity levels for these runs.

CONCLUDING REMARKS

The map of the flow field as a function of blade angular position, while not complete, gives several field point velocity profiles. In locations where data as a function of blade angular position could not be obtained, time-average data were taken. The quantity and quality of the velocity information obtained should provide a useful data base with which to compare and evaluate various hydrodynamic theories.

LDA has proven to be an excellent method for obtaining field point velocities, although some problems remain to be overcome. As the state of the art progresses, obtaining two component field point velocities will become simpler and less costly. Eventually, it will be possible, in some water tunnel facilities, to obtain three component velocity data. When these advances are combined with further automation of the data collection process, particularly computer control of the laser alignment, it should become possible to map the entire time dependent flow field in the same amount of time as is required for taking a conventional wake survey with pressure or thermal probes. Excluding initial equipment expeditures, the costs will compare favorably.

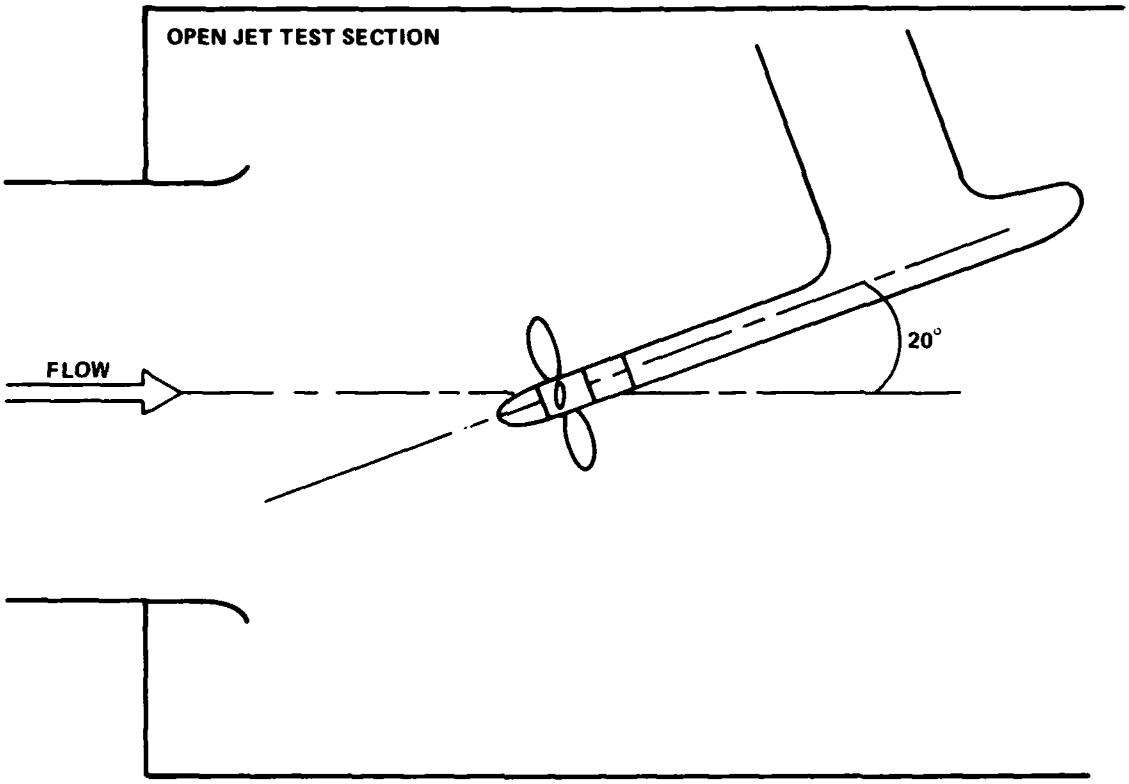


Figure 1a - Sketch of Right Angle Drive

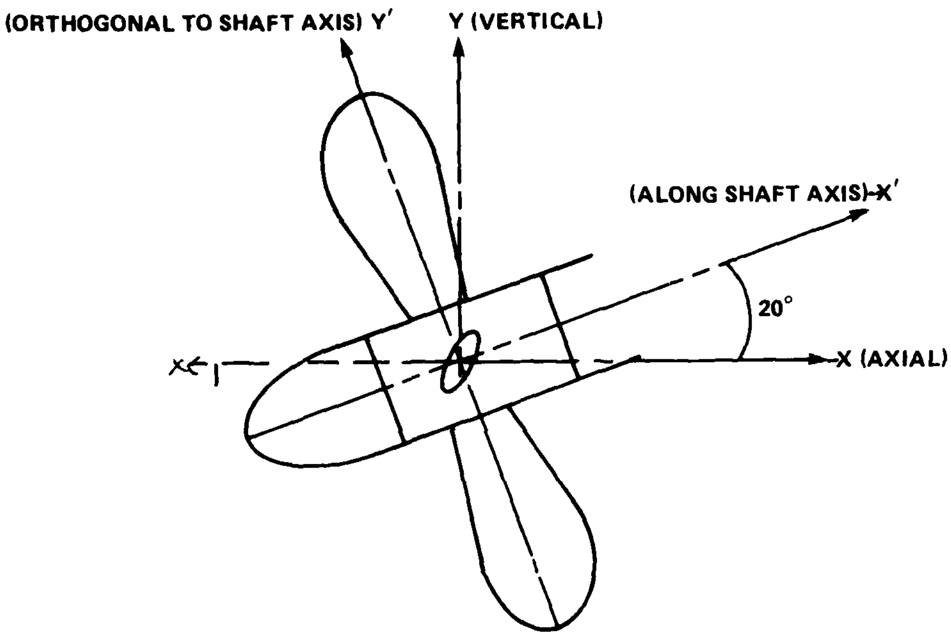


Figure 1b - Detail - Coordinate System

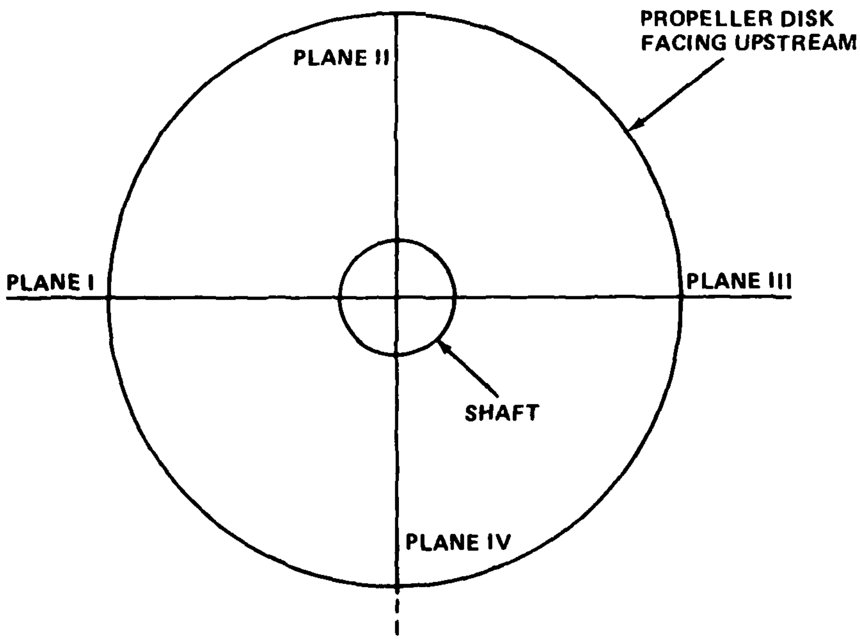
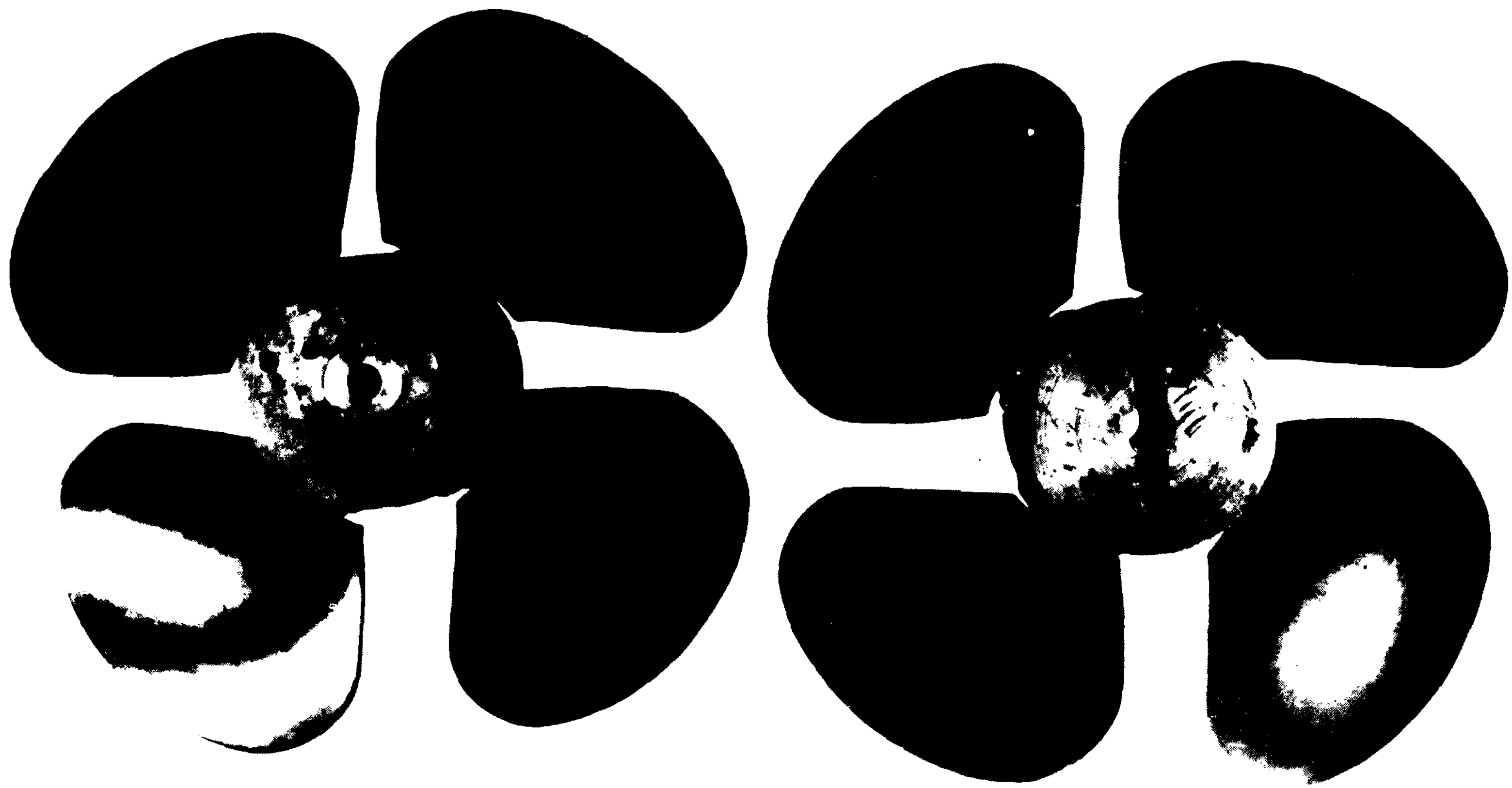


Figure 1c - Detail - Orientation of Data Reference Planes



4710 Suction Side

4711 Pressure Side

Figure 2 - Photograph of DTNSRDC Propellers 4710 and 4711

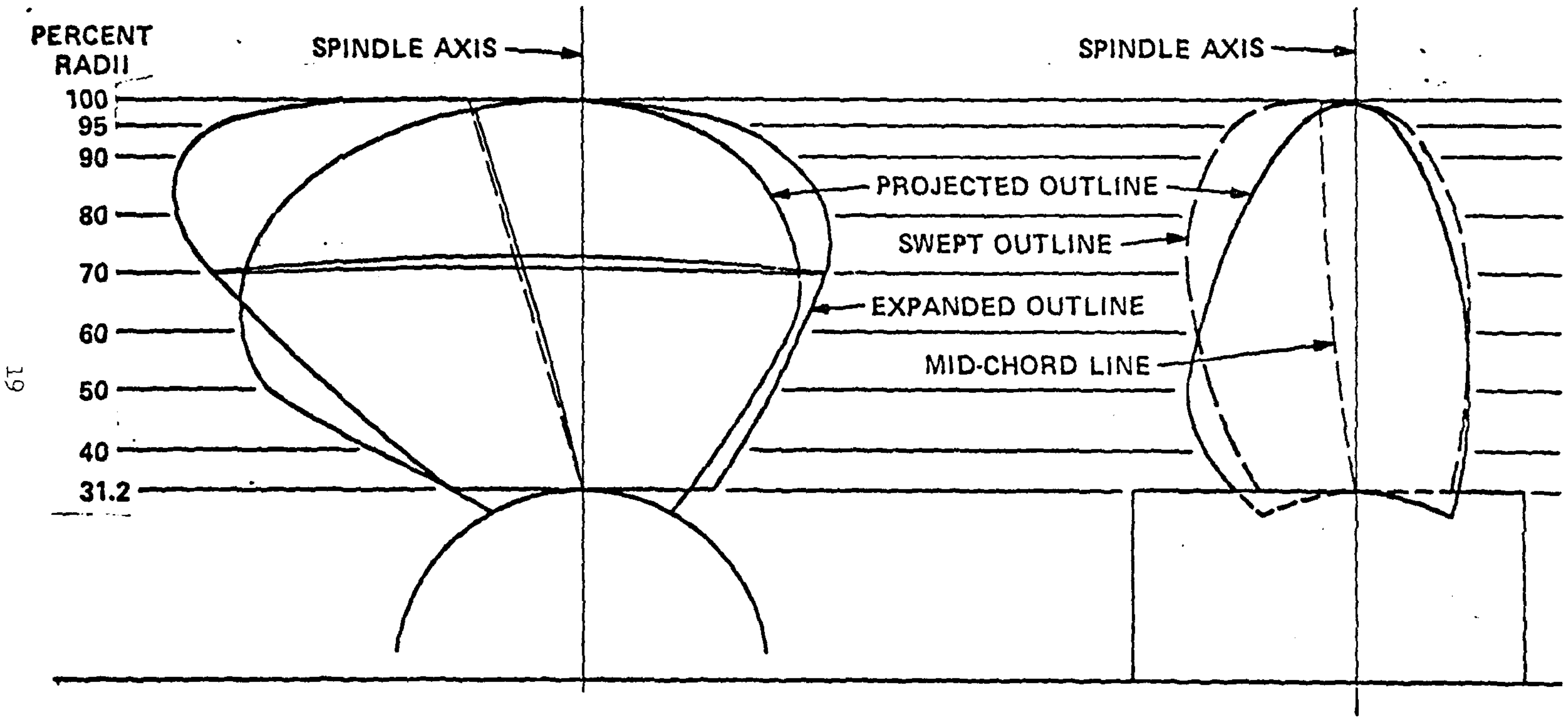
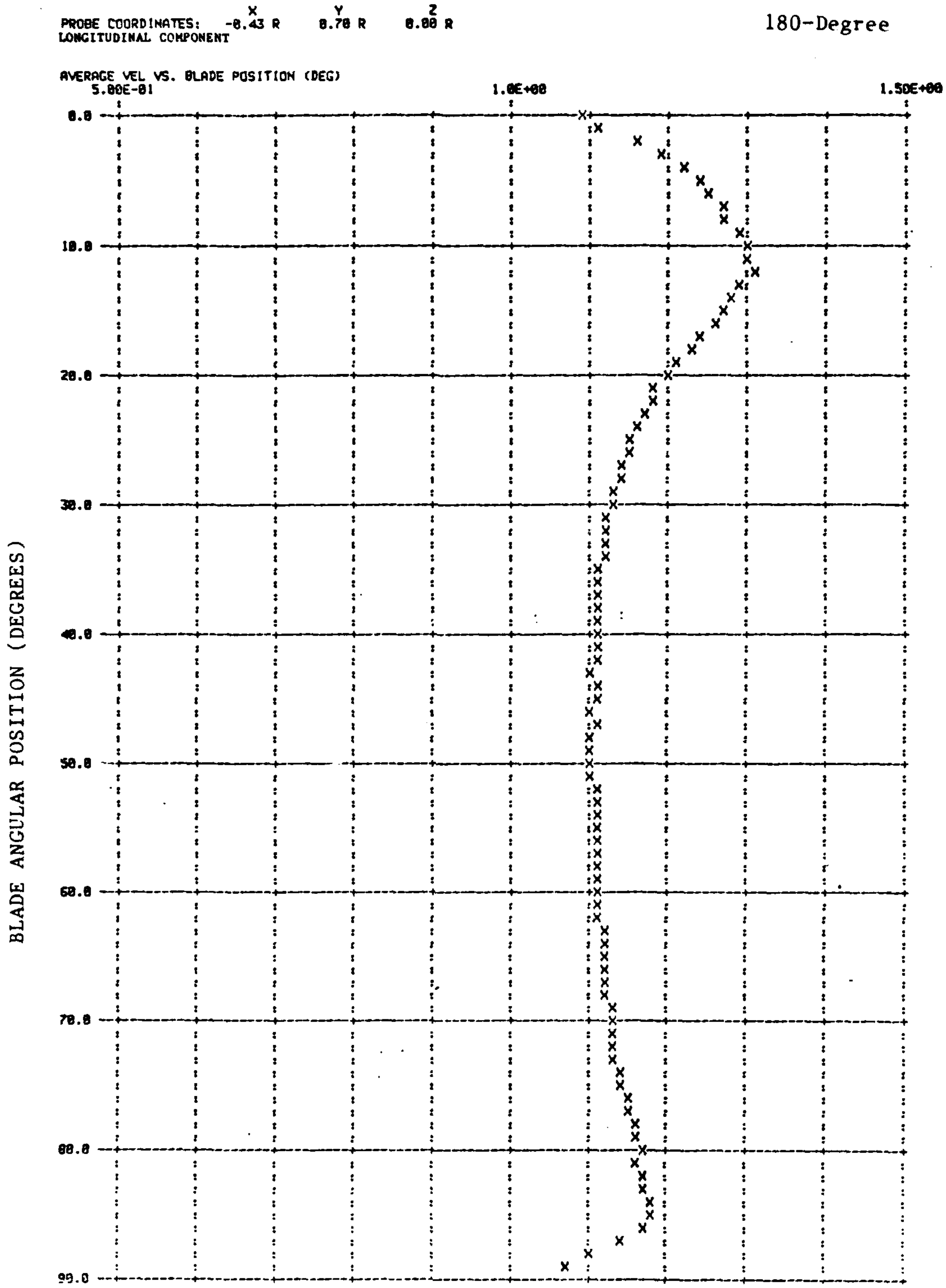


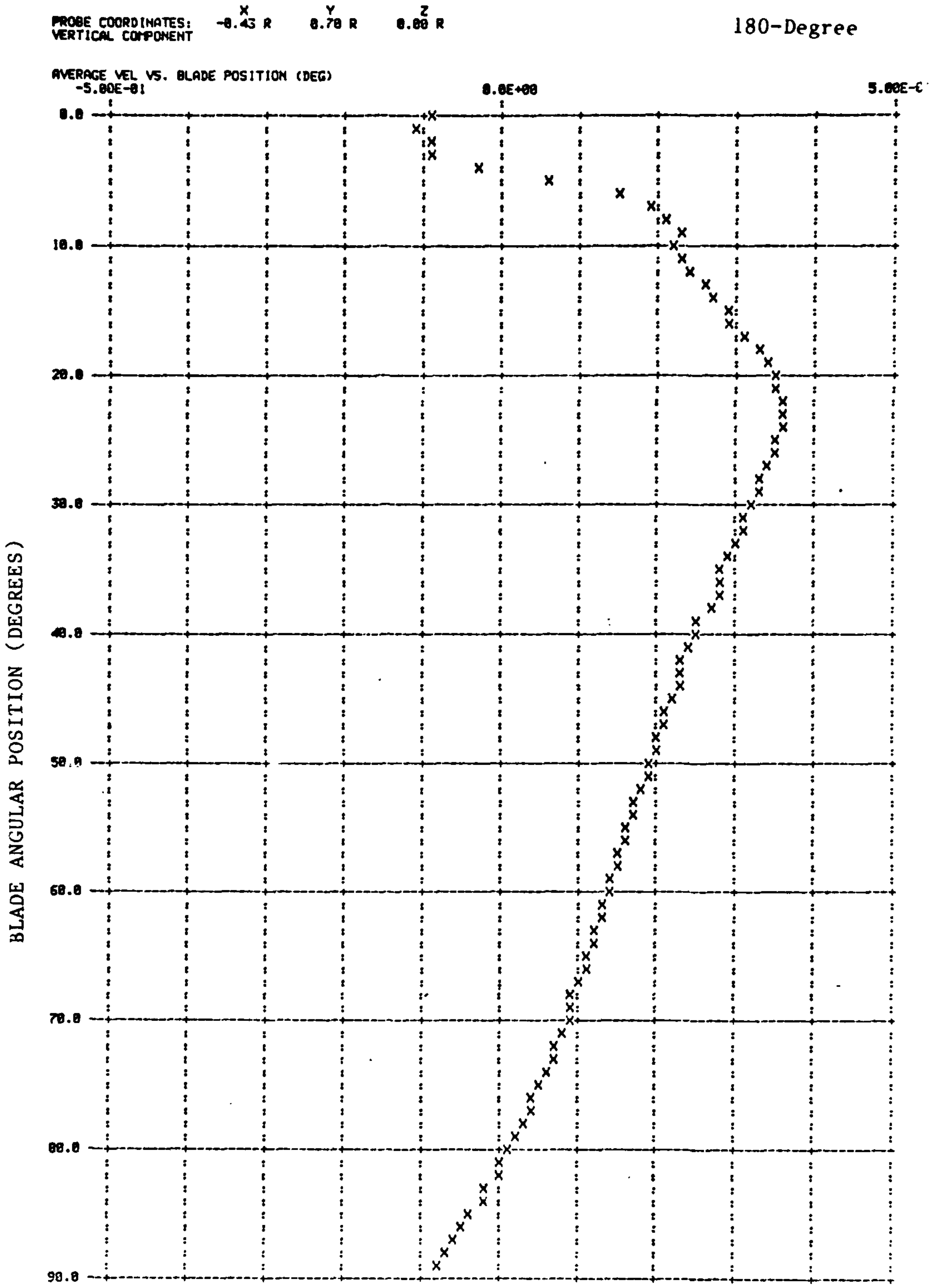
Figure 3 - Schematic Drawing of CP Propellers on R/V ATHENA (PG-84 Class); DTNSRDC Model Propellers 4710 and 4711

180-Degree



4a - Computer Generated Graph of Velocity vs. Blade Angular Position

180-Degree



4b - Computer Generated Graph of Velocity vs. Blade Angular Position

180-Degree

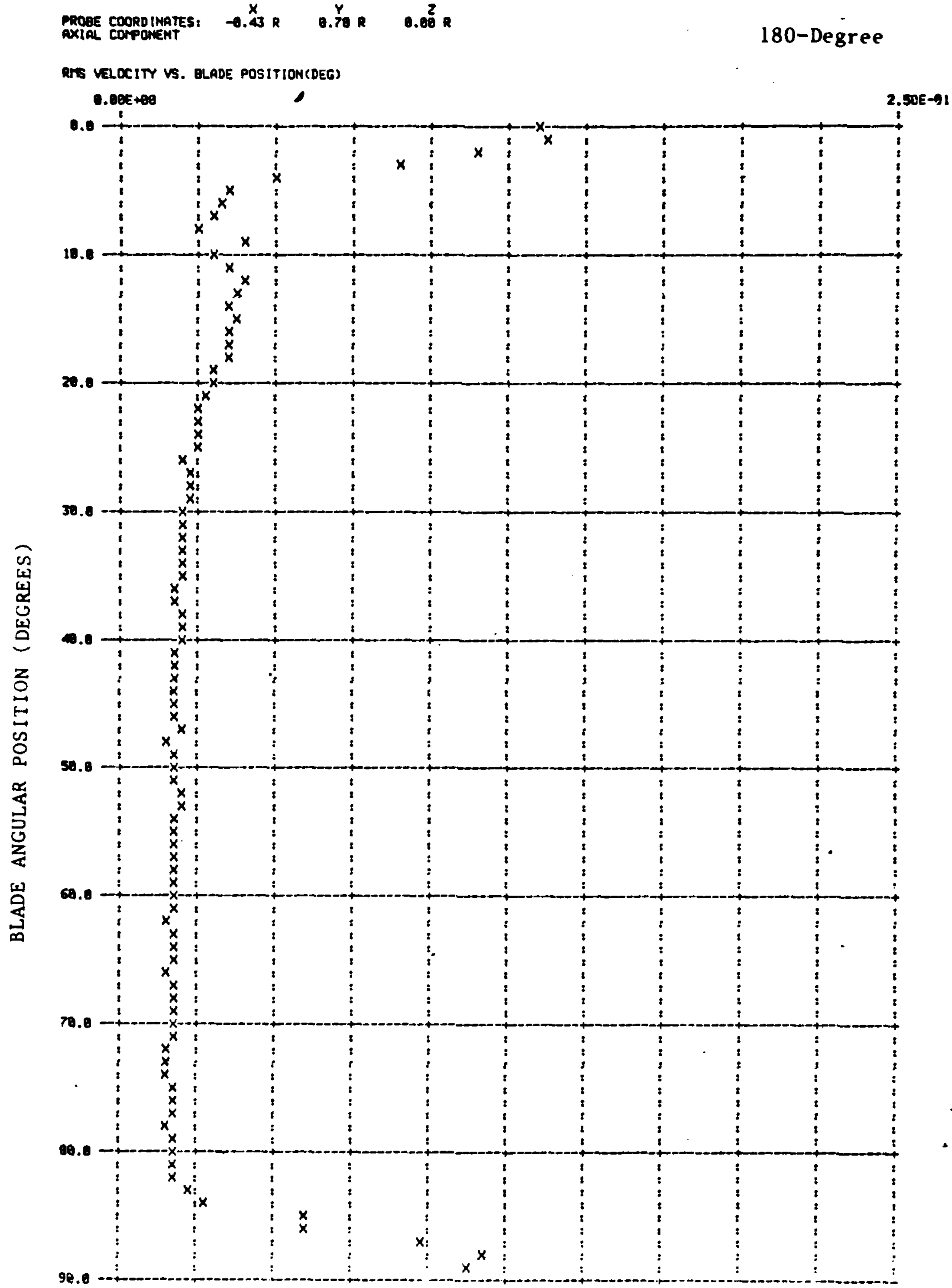
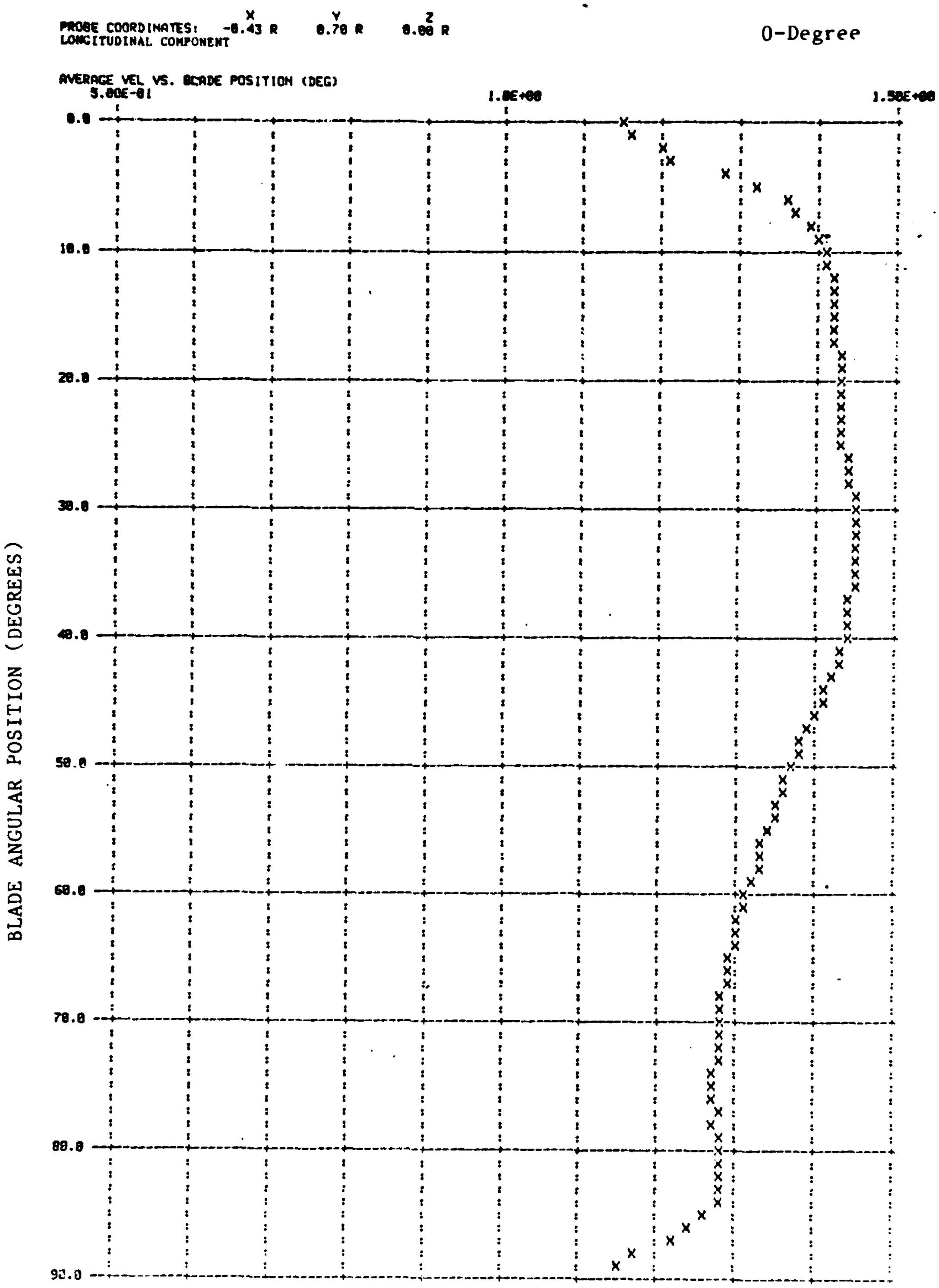
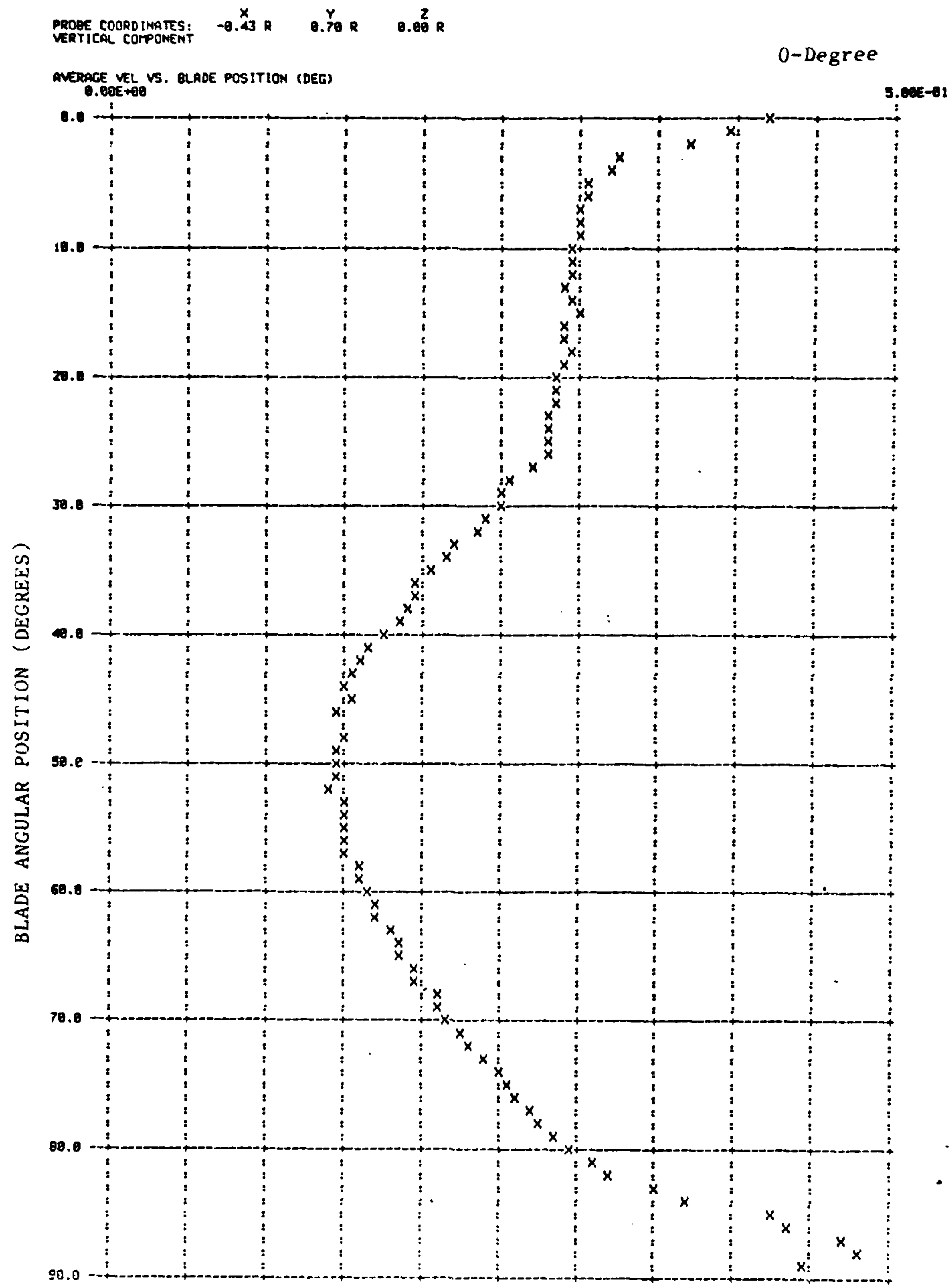


Figure 4c - Computer Generated Graph of RMS Velocity vs. Blade Angular Position at Shaft Inclination of 20 Degrees

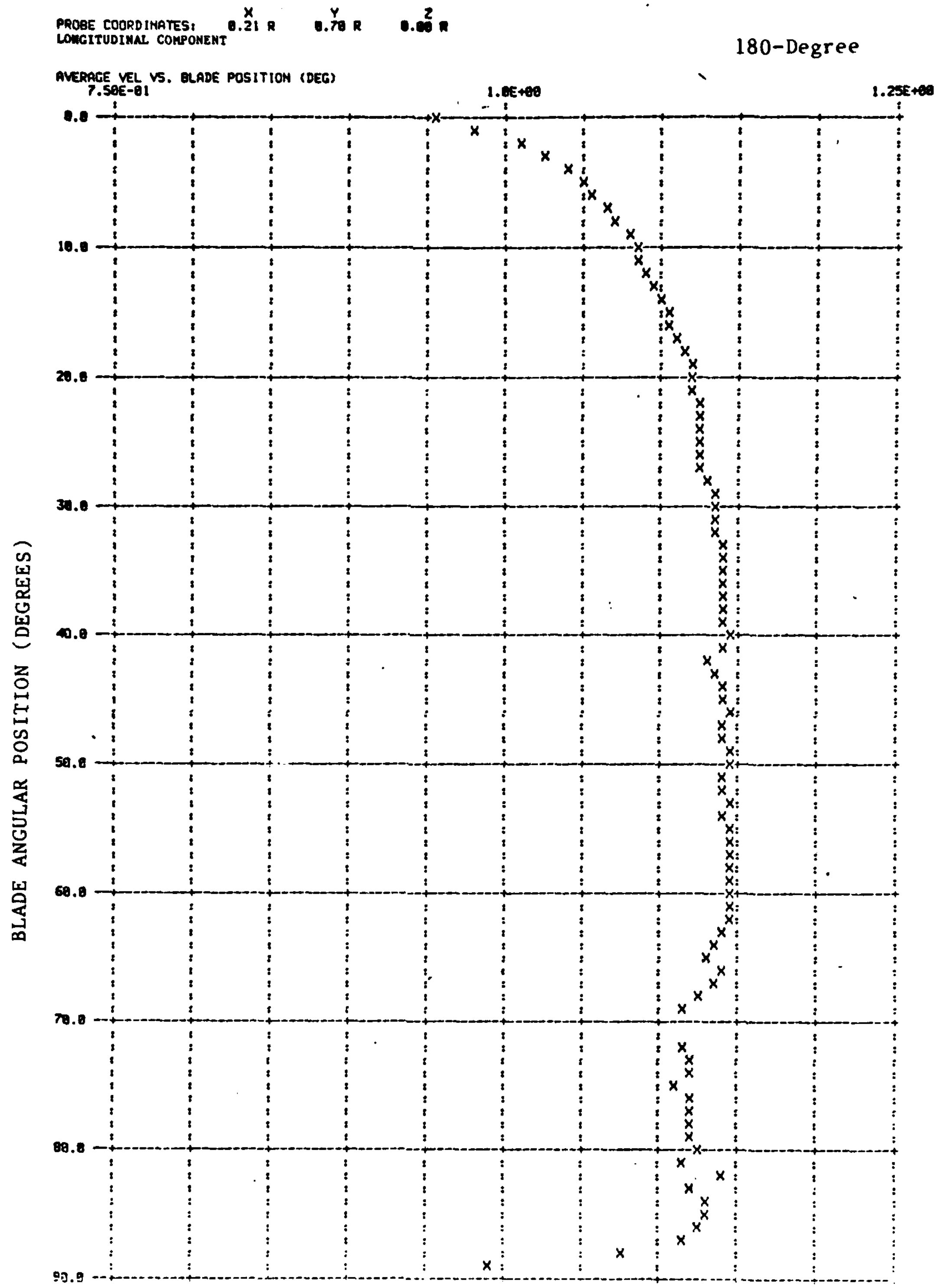


5a - Computer Generated Graph of Velocity vs. Blade Angular Position



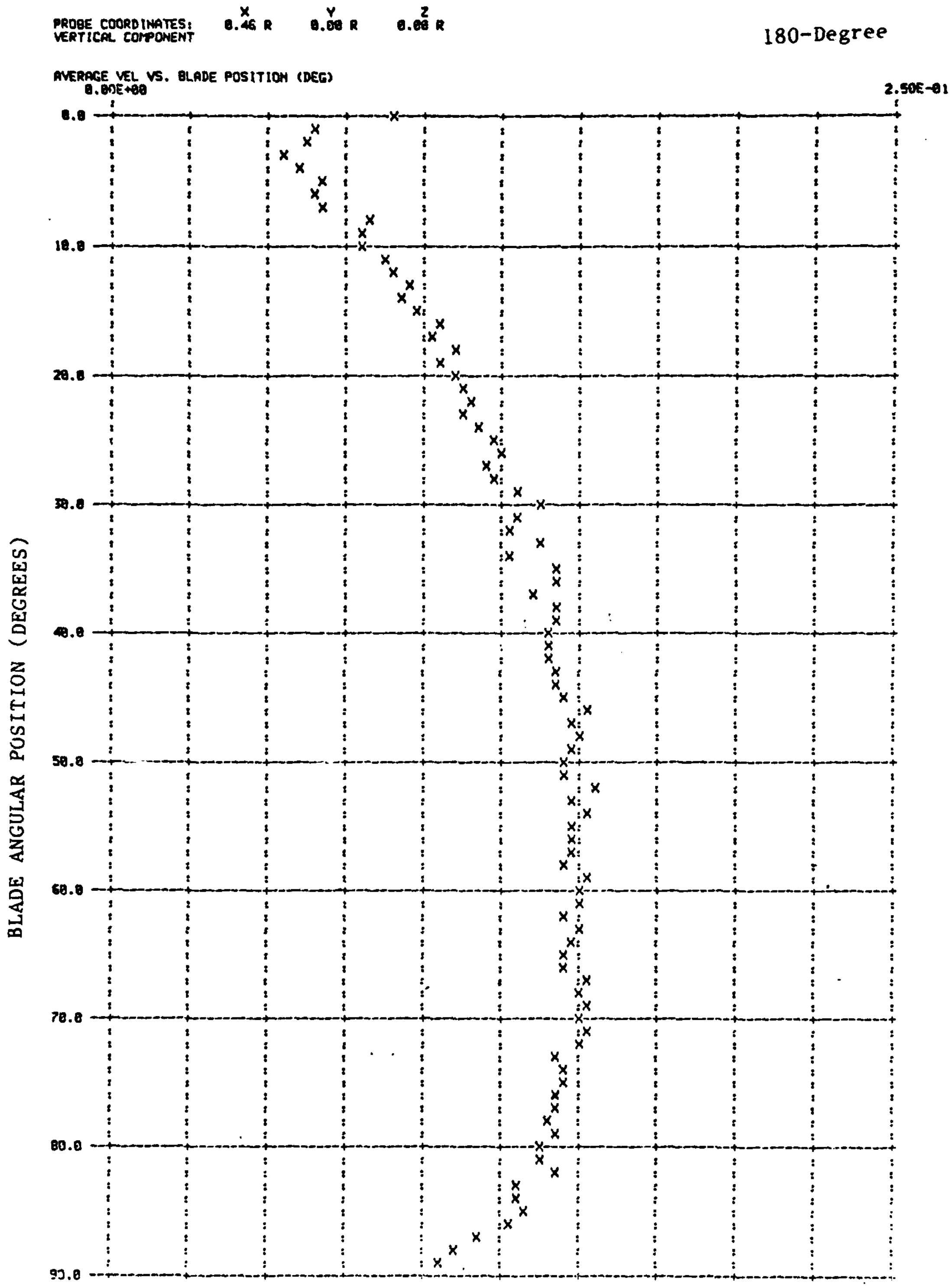
5b - Computer Generated Graph of Velocity vs. Blade Angular Position

180-Degree



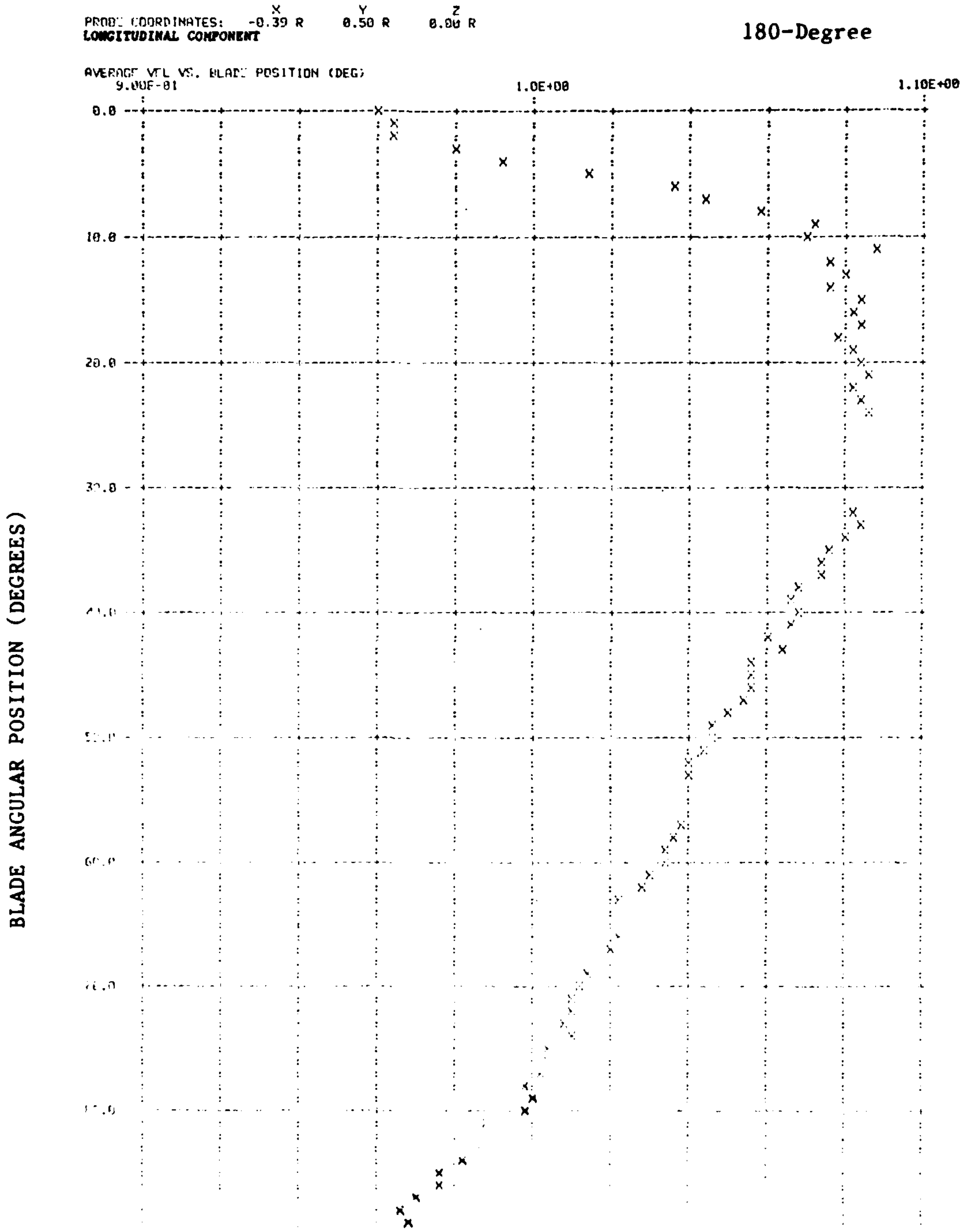
6a - Computer Generated Graph of Velocity vs. Blade Angular Position

180-Degree

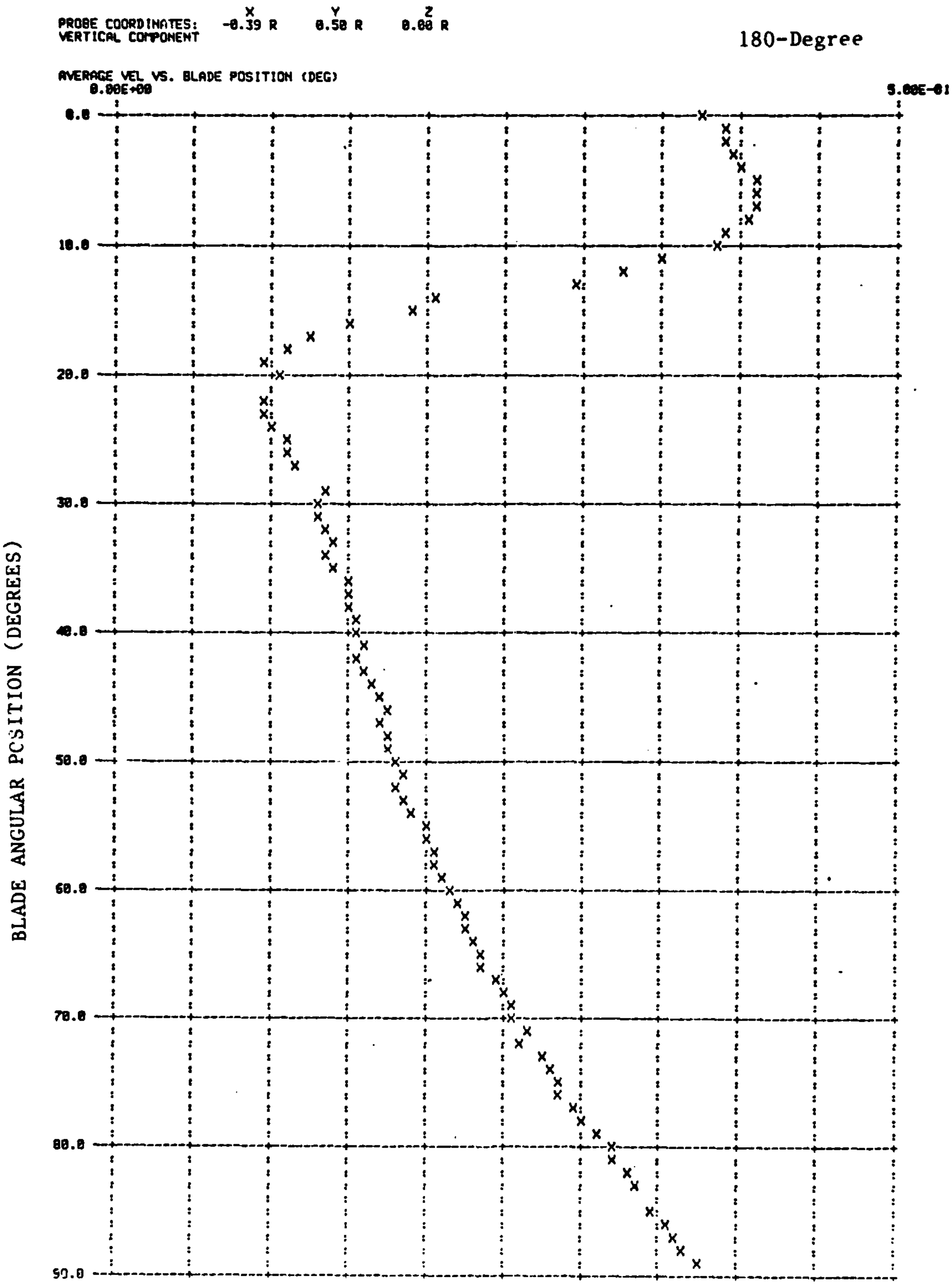


6b - Computer Generated Graph of Velocity vs. Blade Angular Position

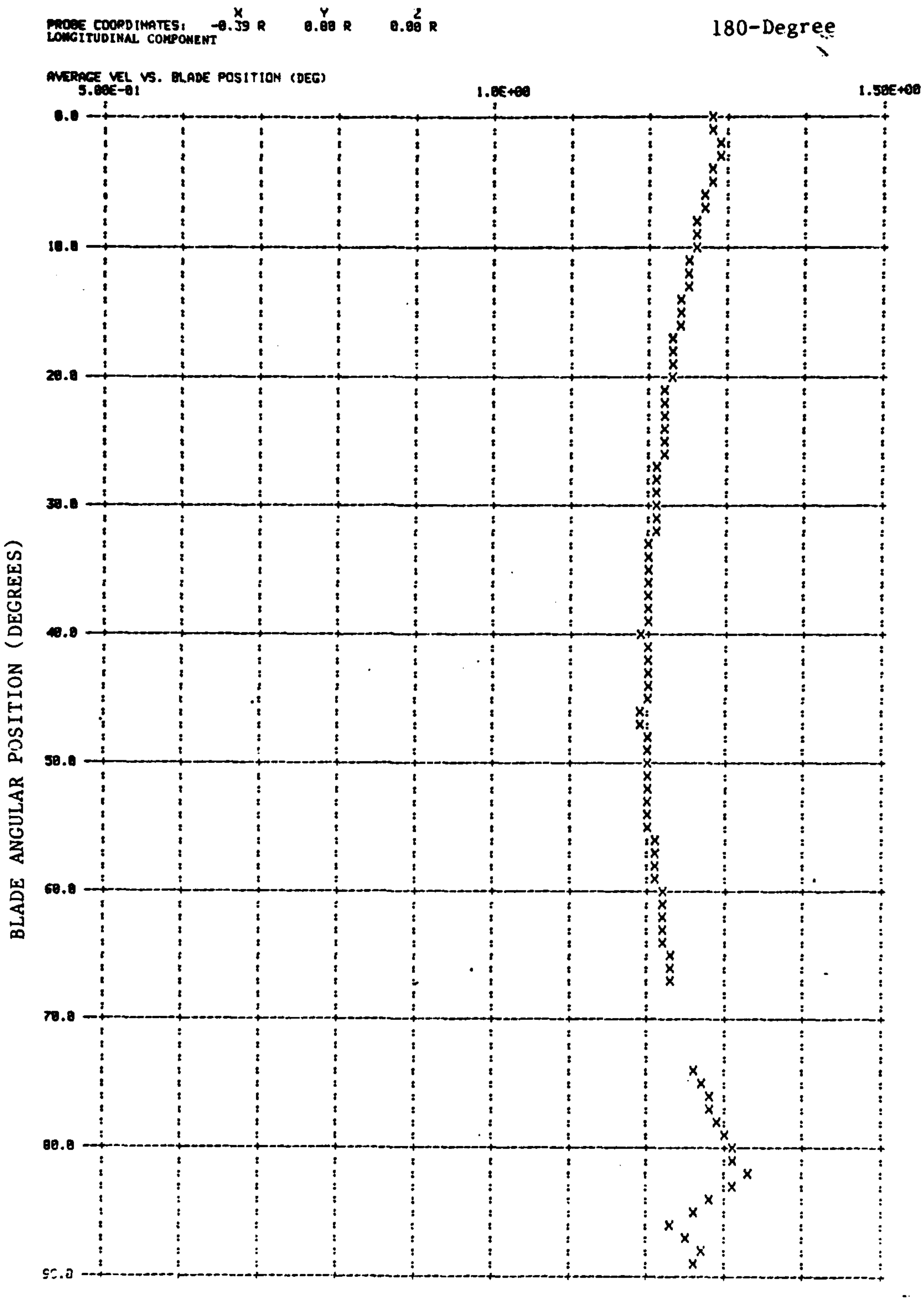
180-Degree



7a - Computer Generated Graph of Velocity vs. Blade Angular Position

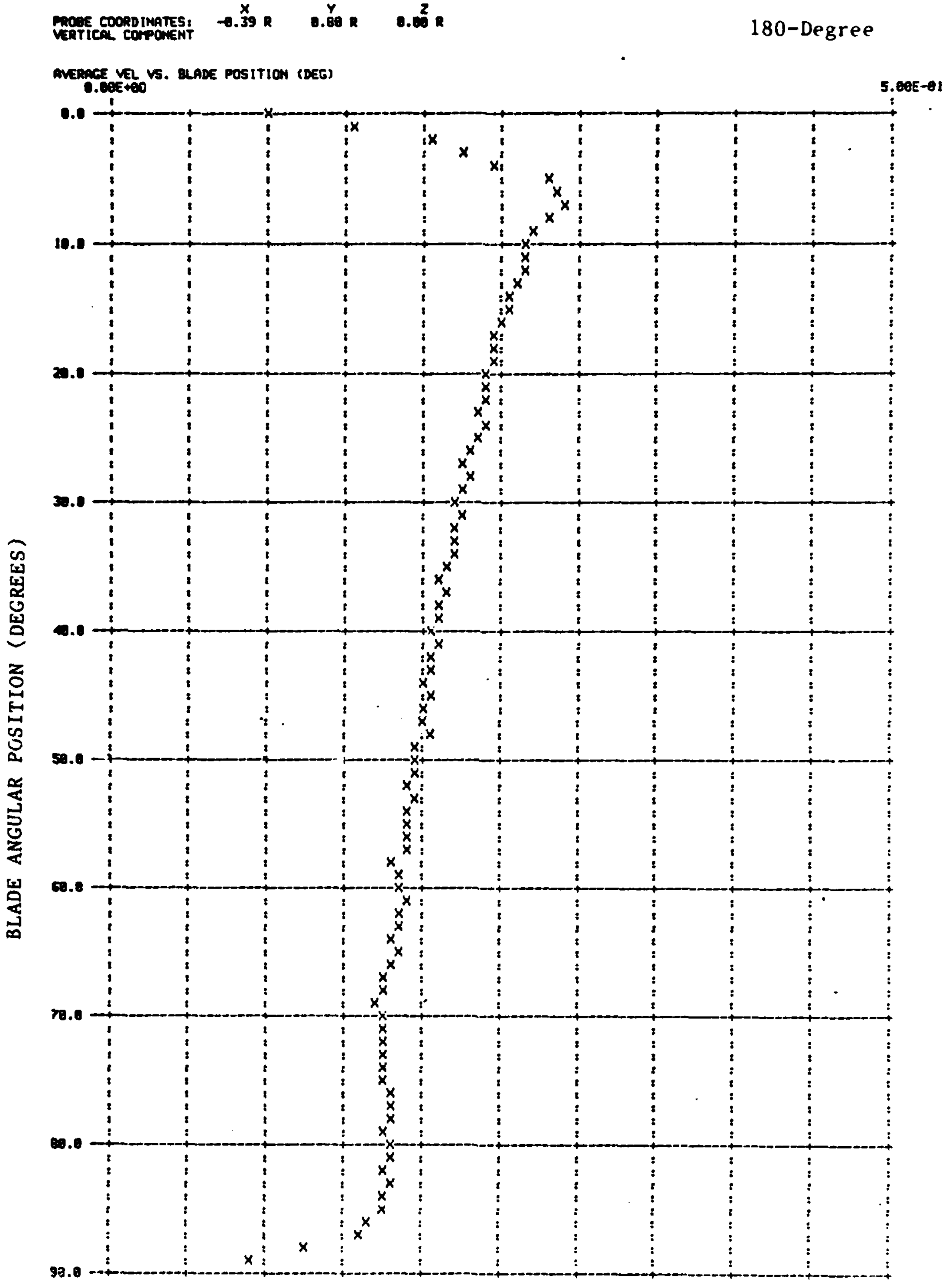


7b - Computer Generated Graph of Velocity vs. Blade Angular Position



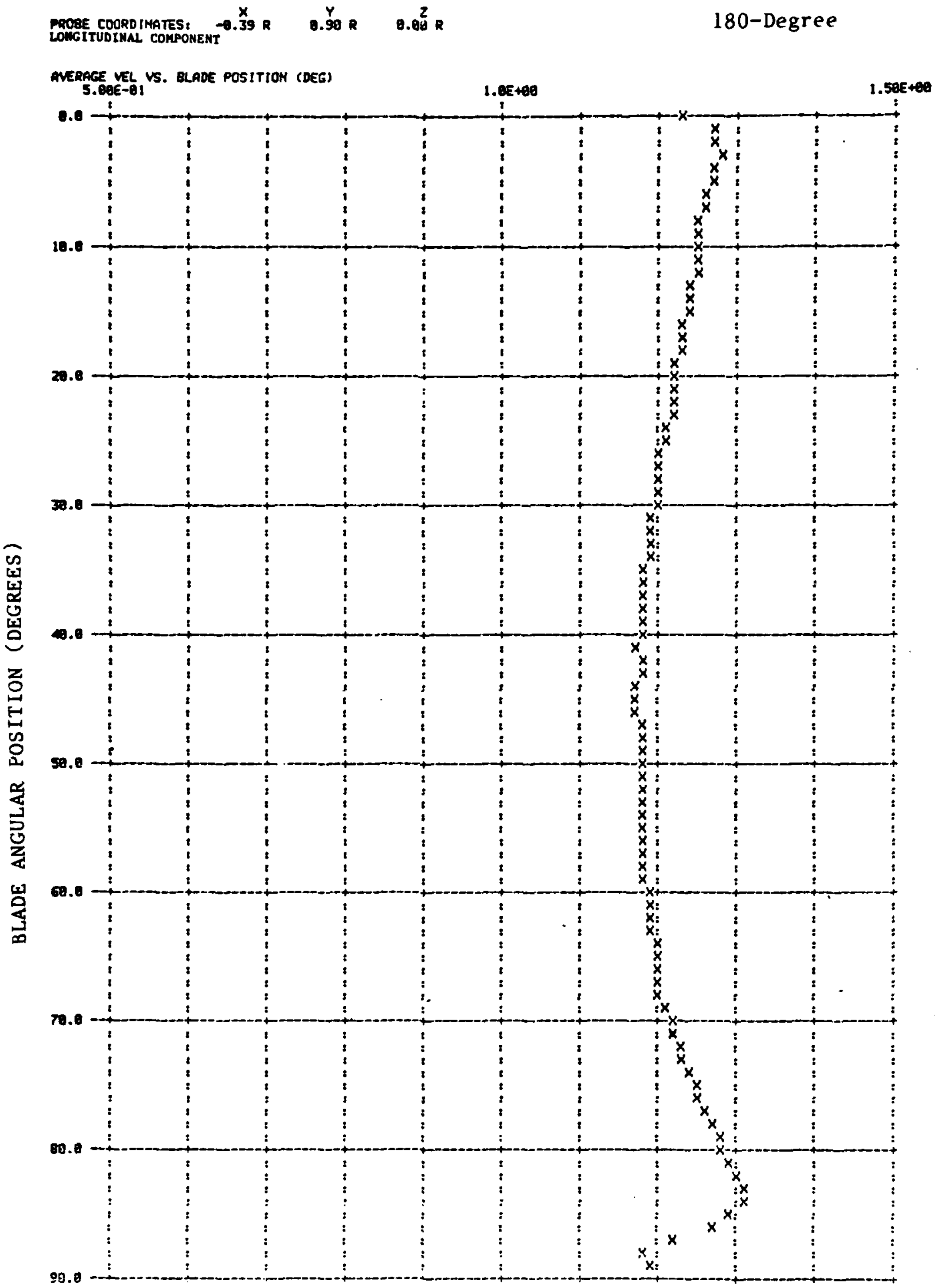
8a - Computer Generated Graph of Velocity vs. Blade Angular Position

180-Degree



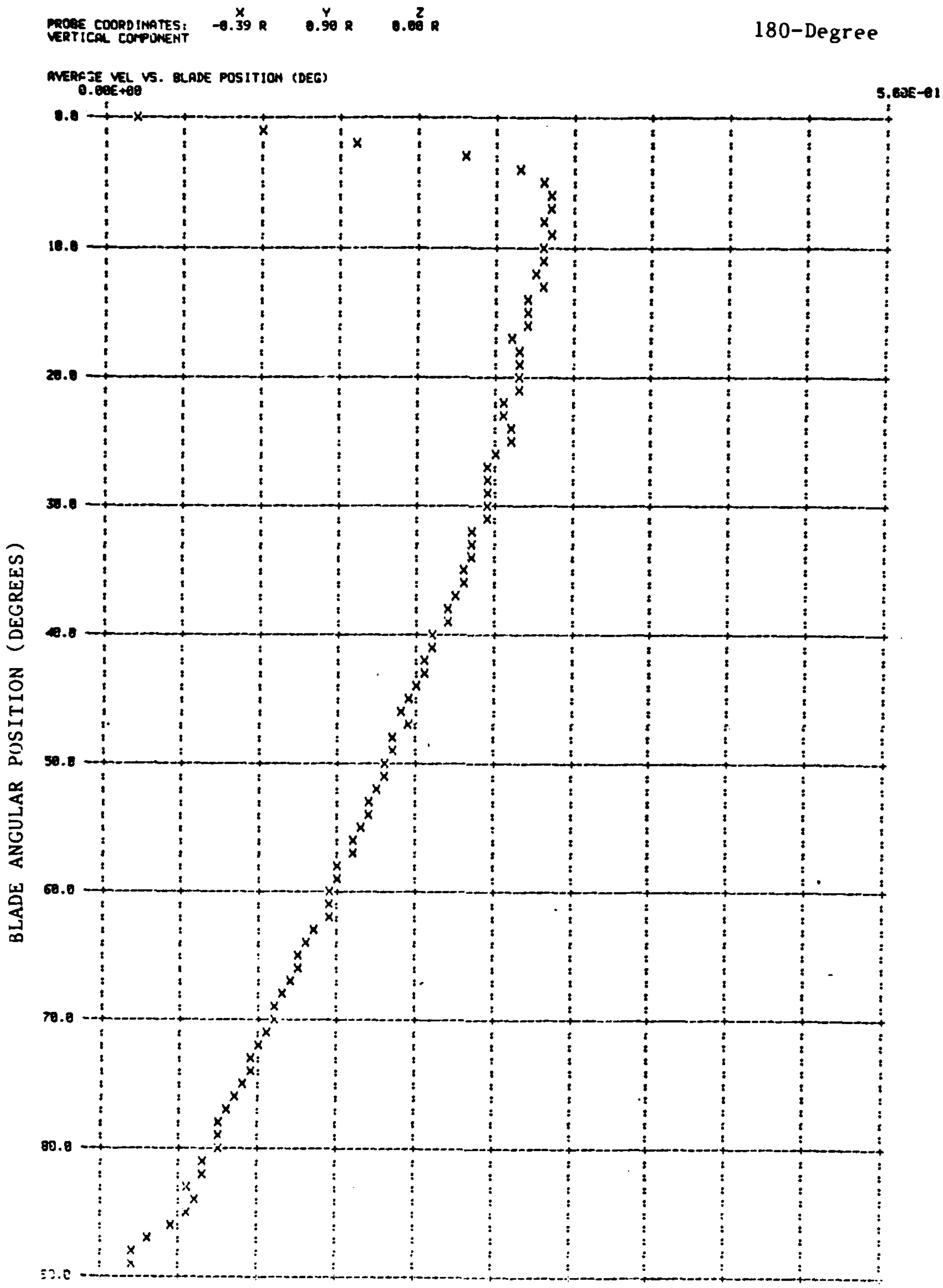
8b - Computer Generated Graph of Velocity vs. Blade Angular Position

180-Degree

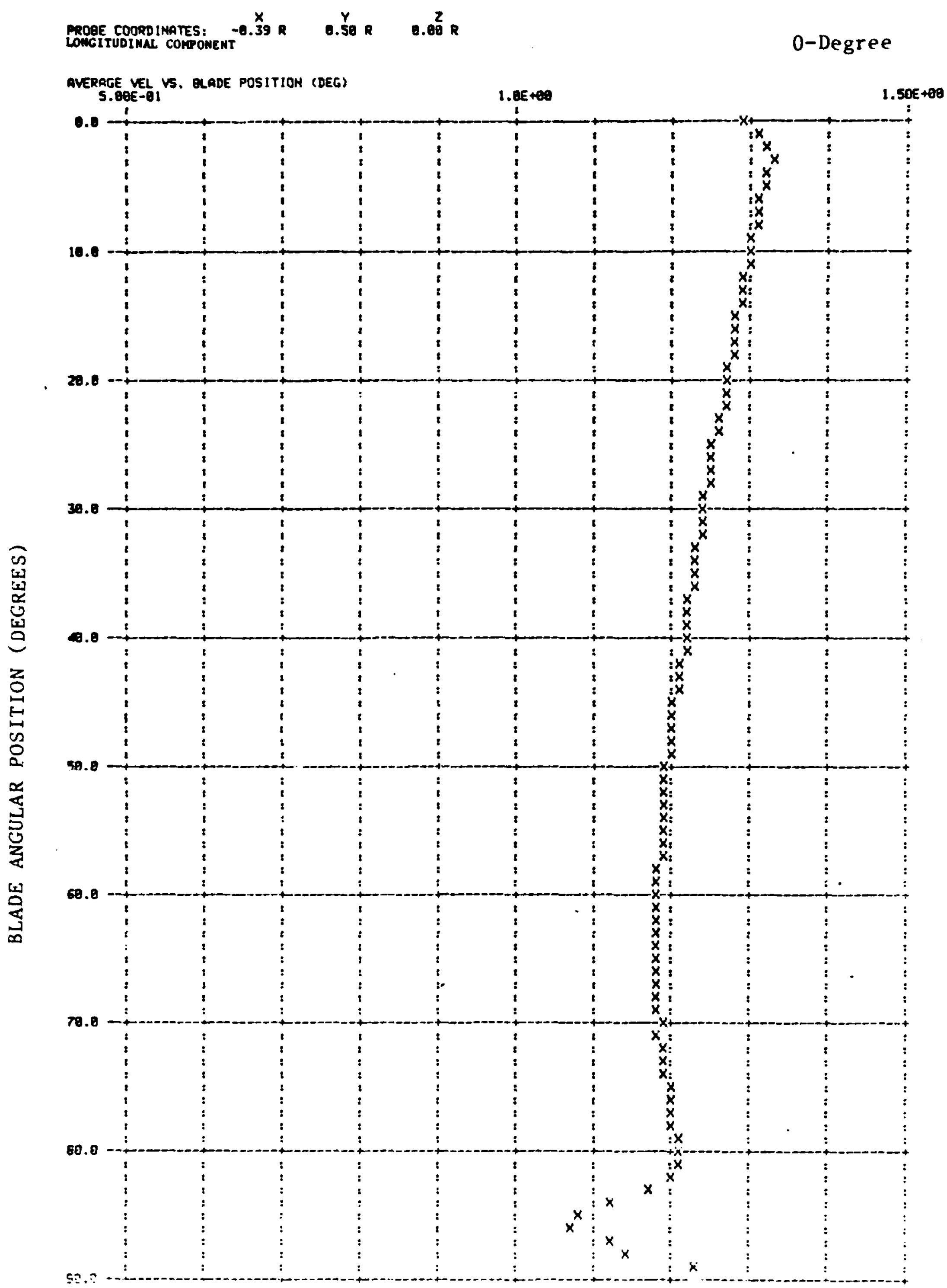


9a - Computer Generated Graph of Velocity vs. Blade Angular Position

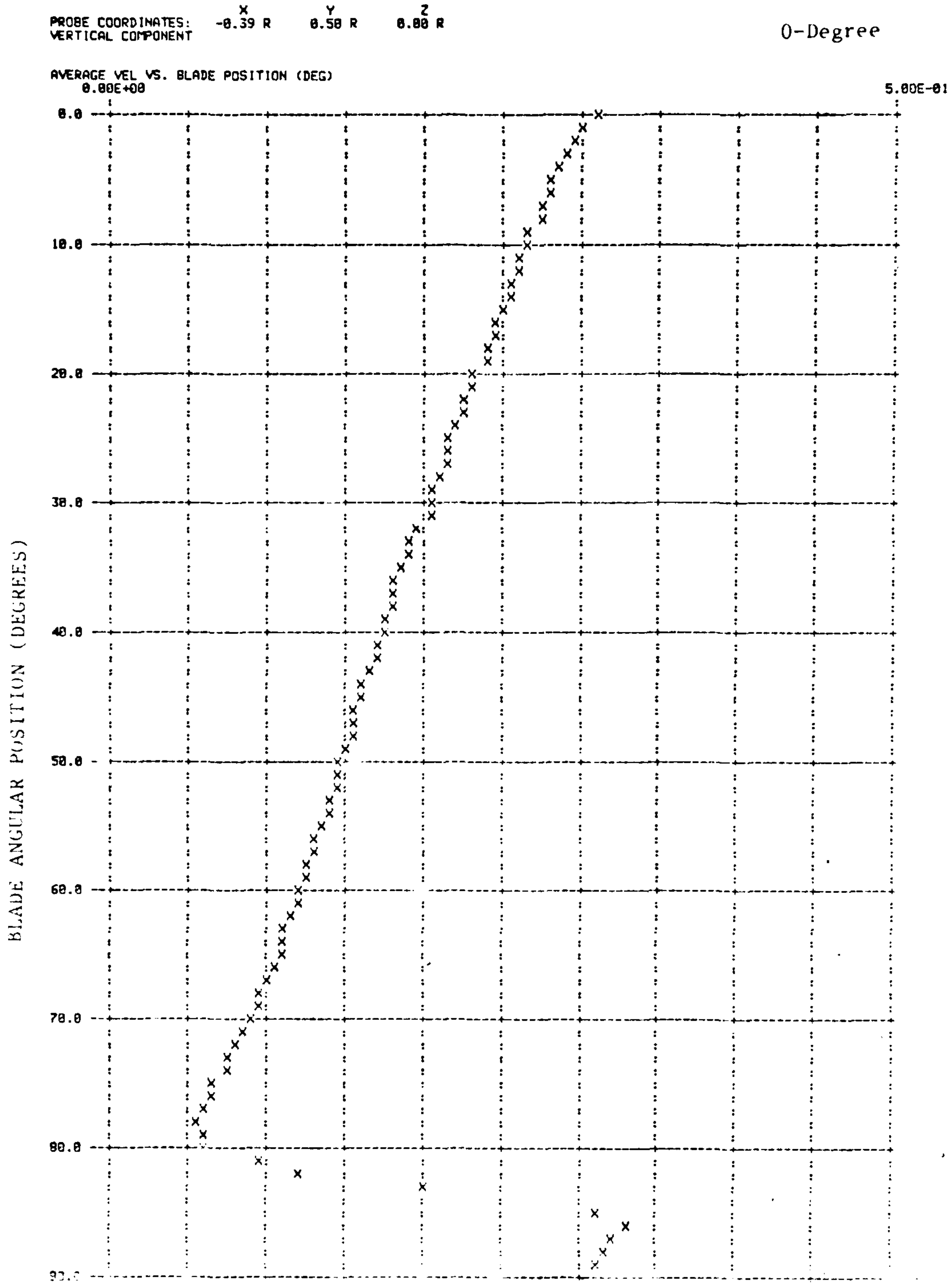
180-Degree



9b - Computer Generated Graph of Velocity vs. Blade Angular Position



10a - Computer Generated Graph of Velocity vs. Blade Angular Position

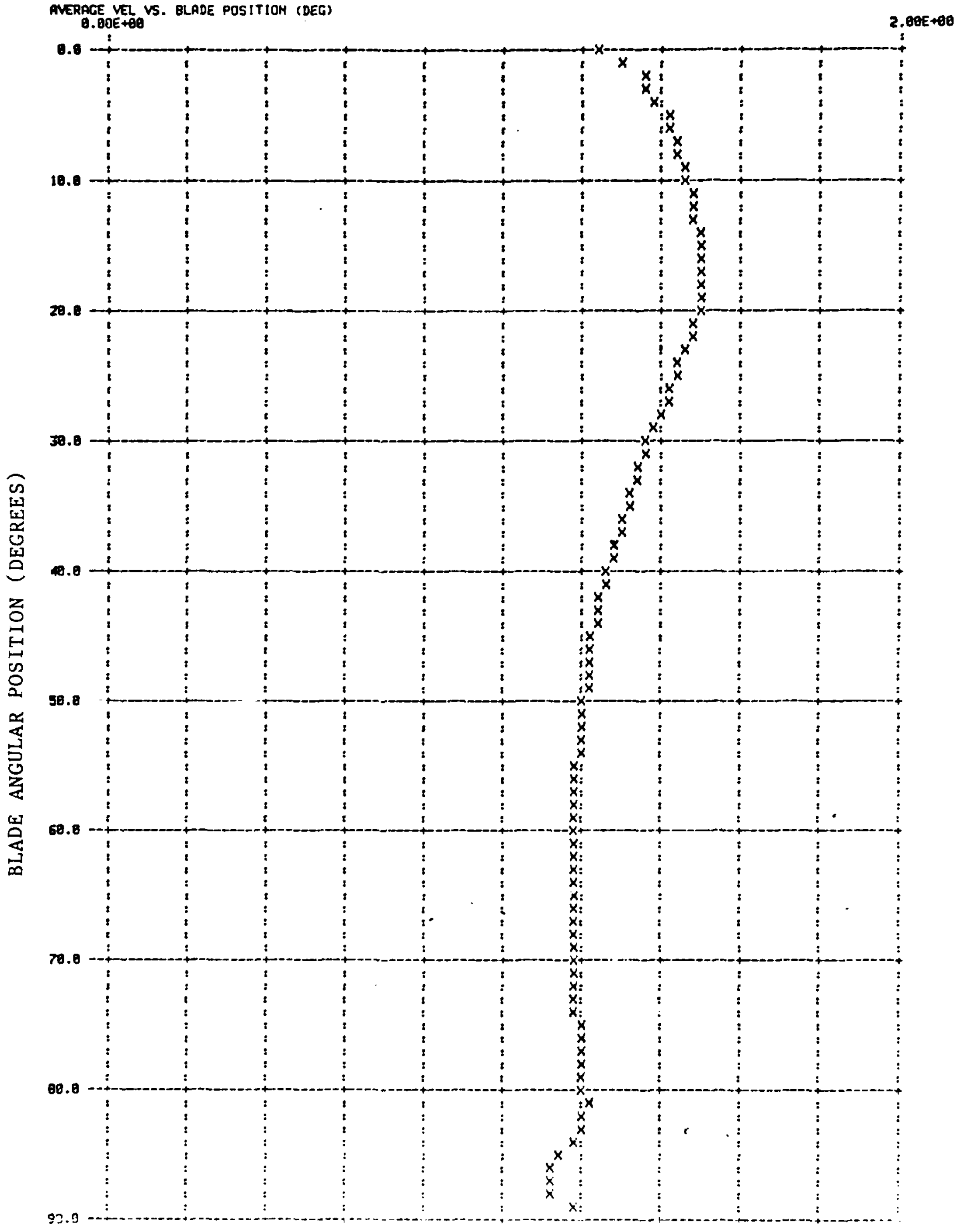


10b - Computer Generated Graph of Velocity vs. Blade Angular Position

PROBE COORDINATES: X -0.39 R Y 0.00 R Z 0.00 R
LONGITUDINAL COMPONENT

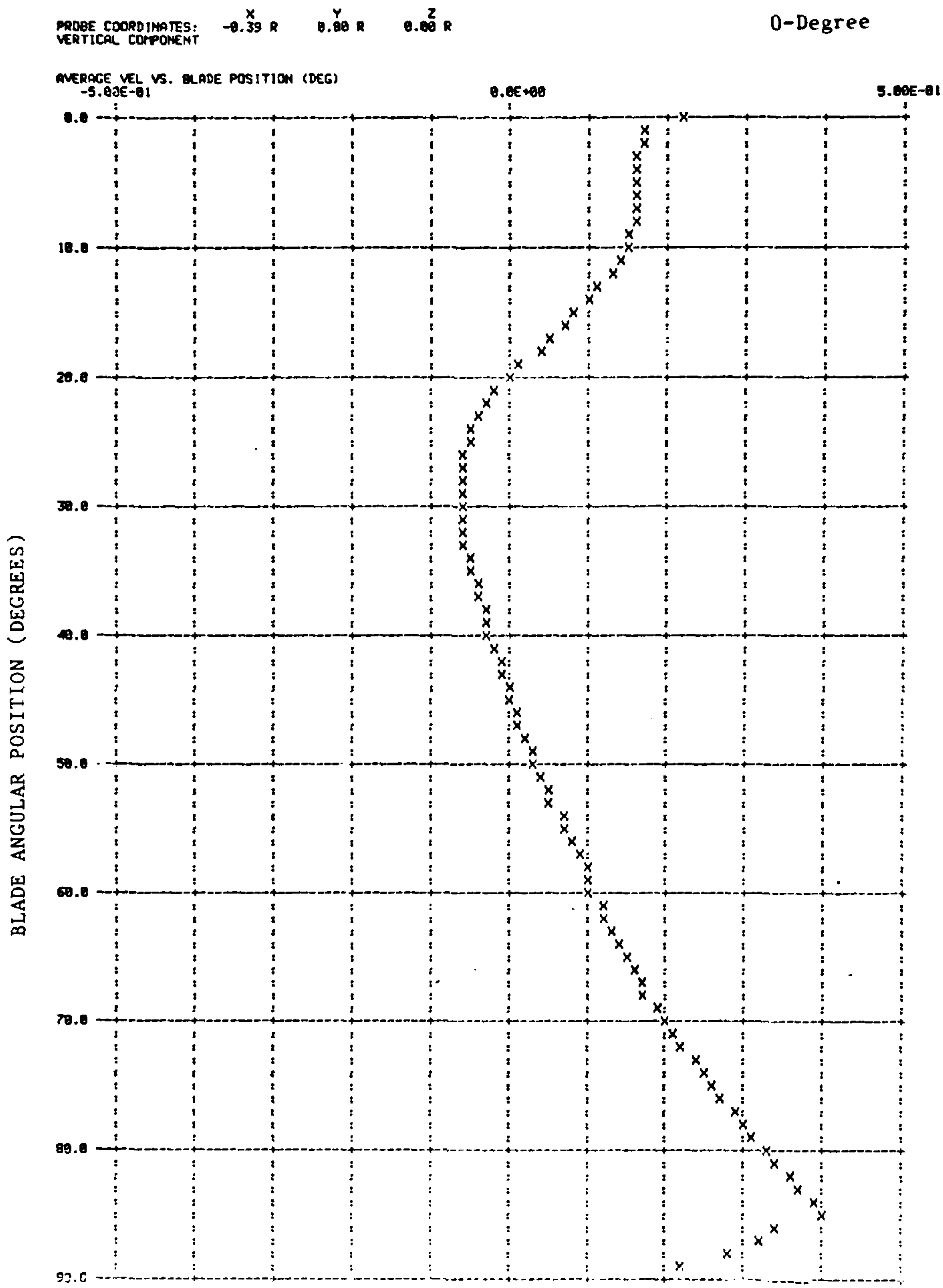
0-Degree

AVERAGE VEL VS. BLADE POSITION (DEG)

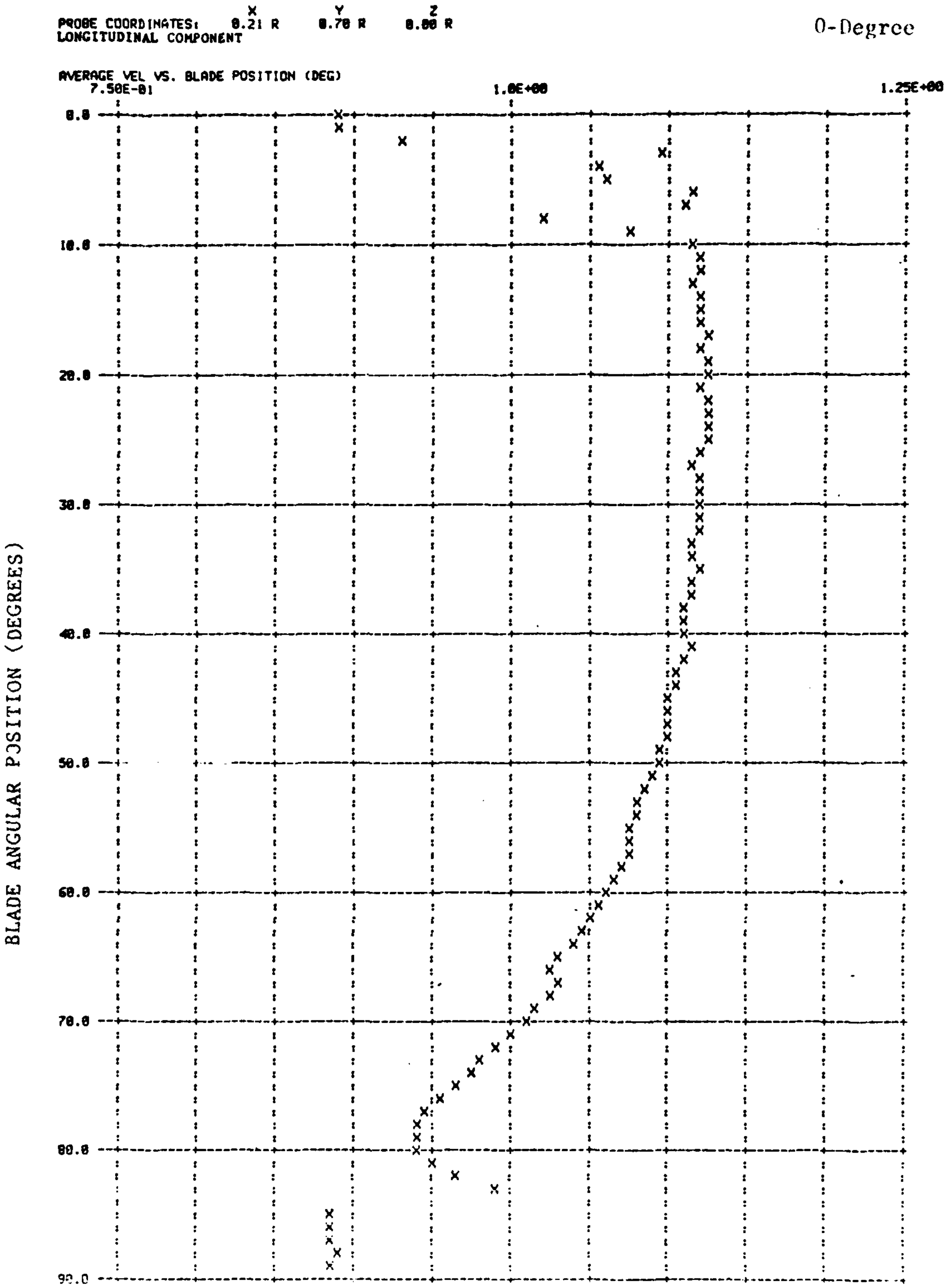


IIa - Computer Generated Graph of Velocity vs. Blade Angular Position

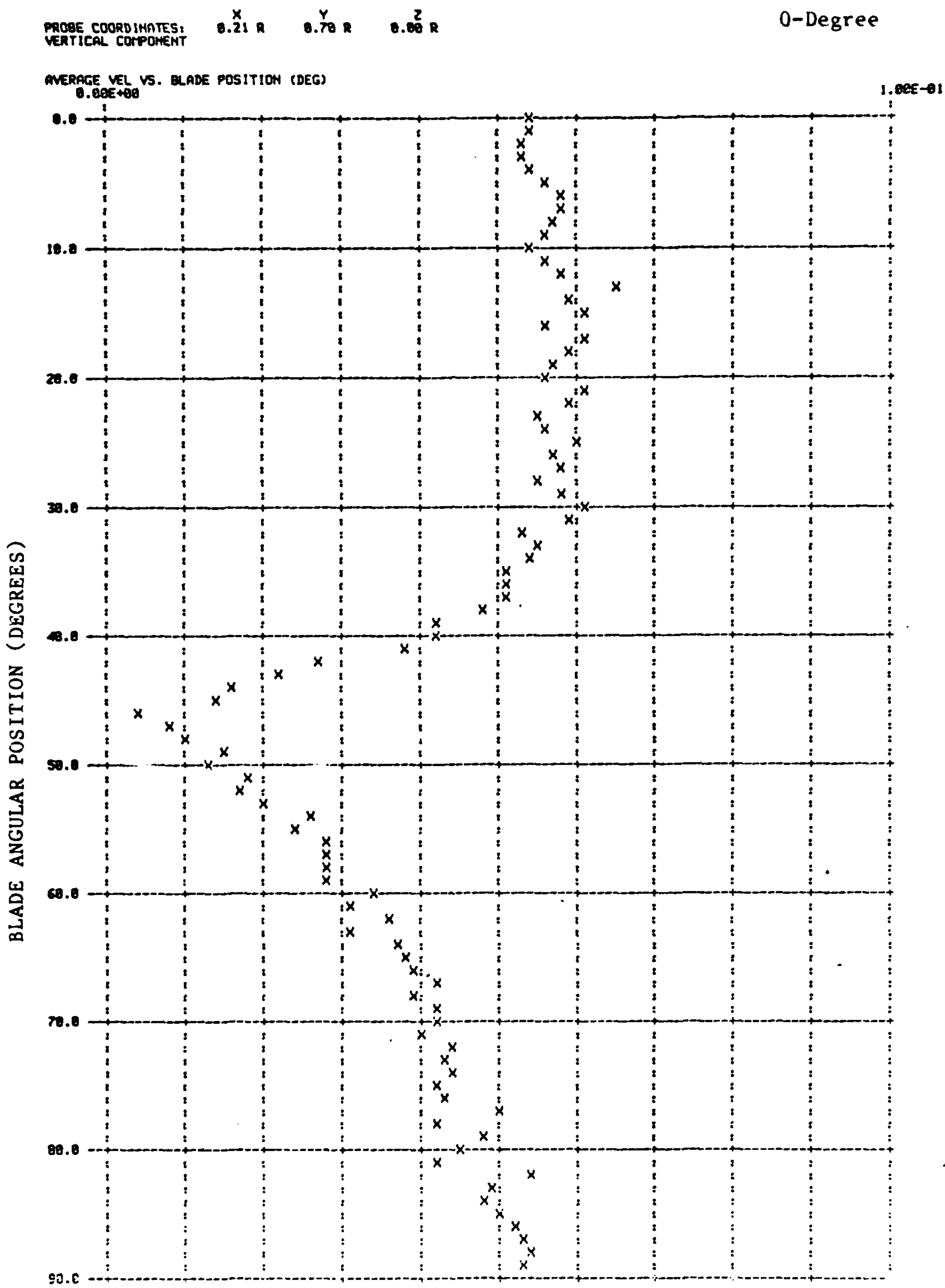
0-Degree



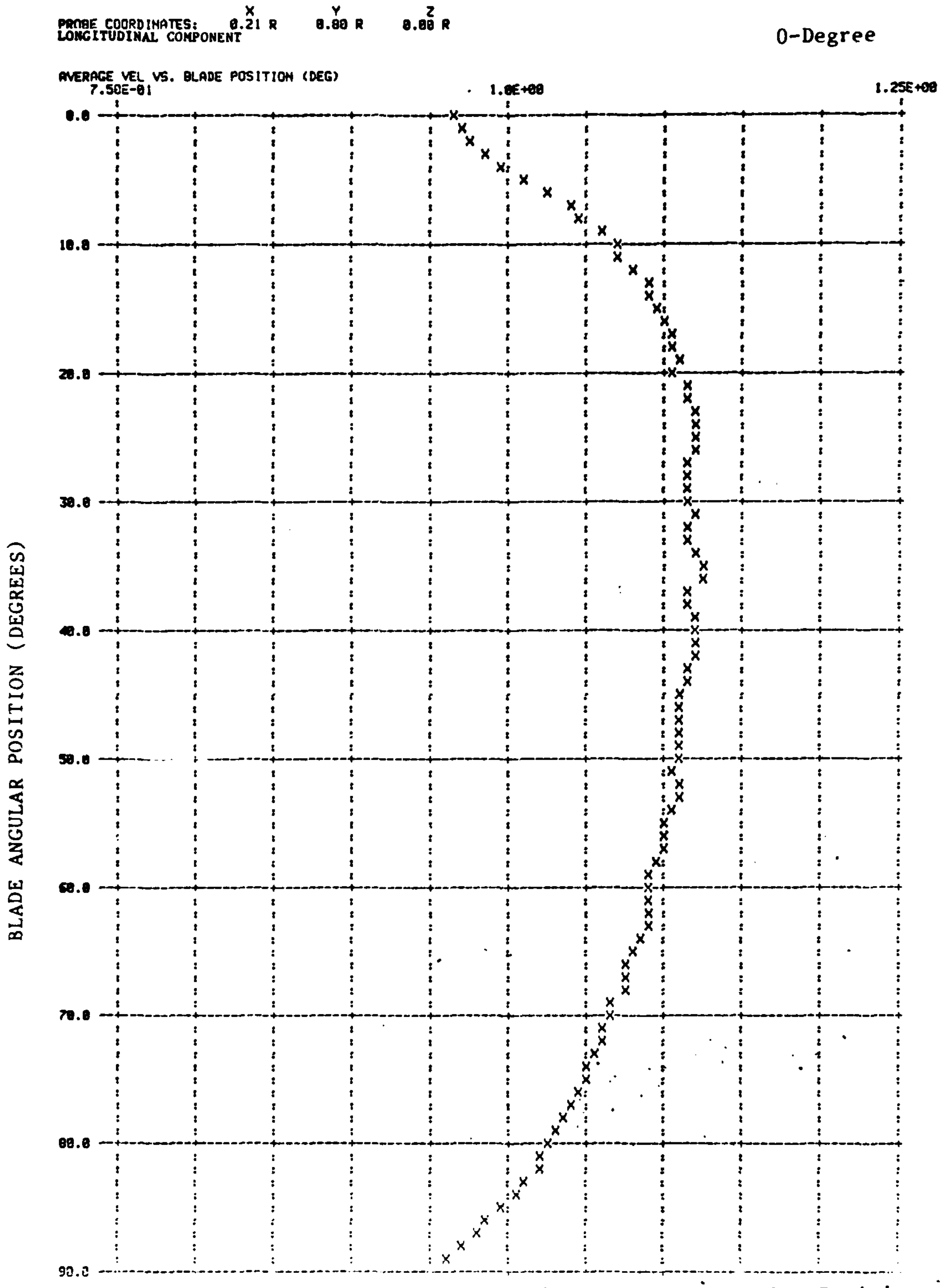
11b - Computer Generated Graph of Velocity vs. Blade Angular Position



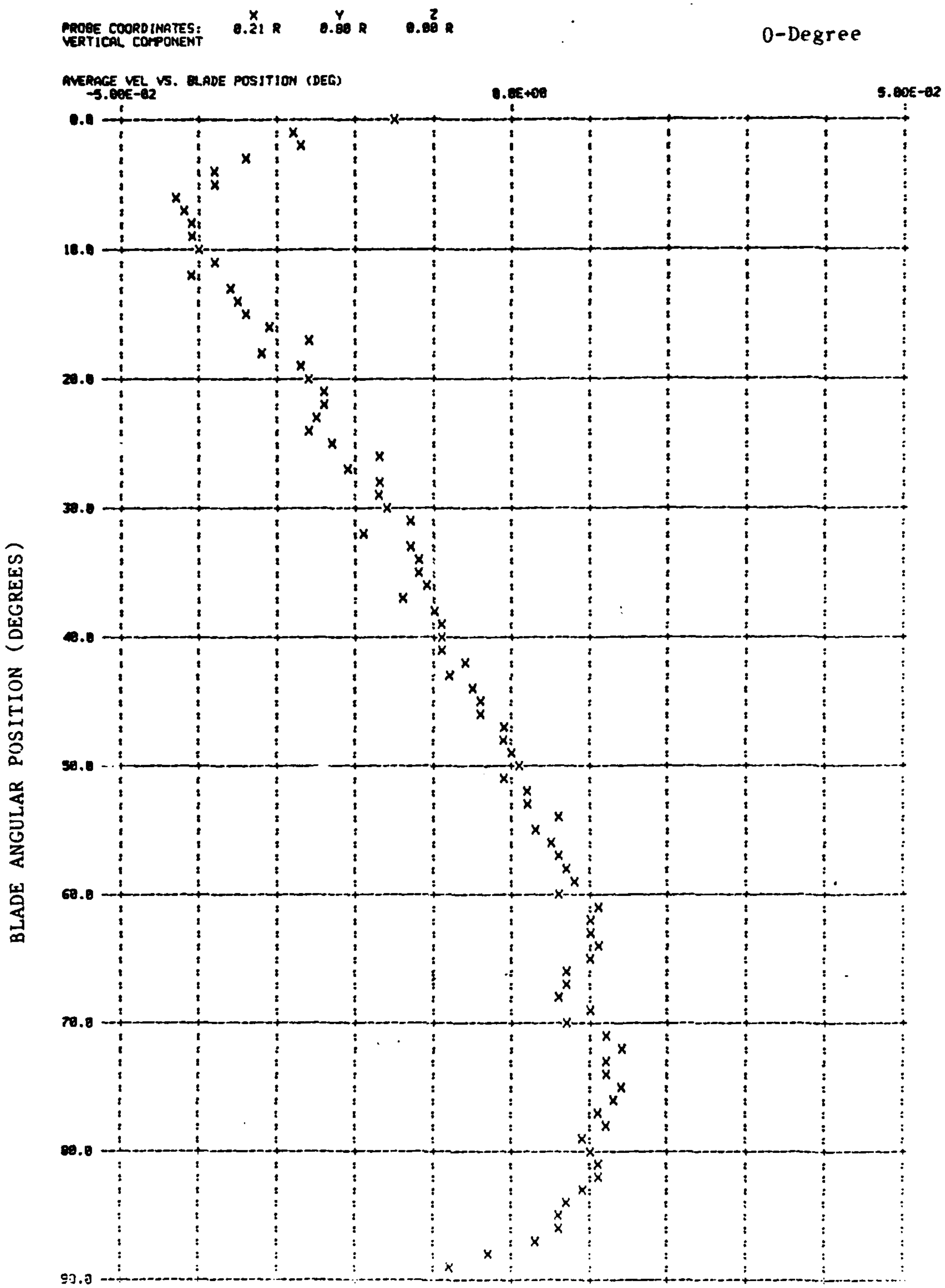
12a - Computer Generated Graph of Velocity vs. Blade Angular Position



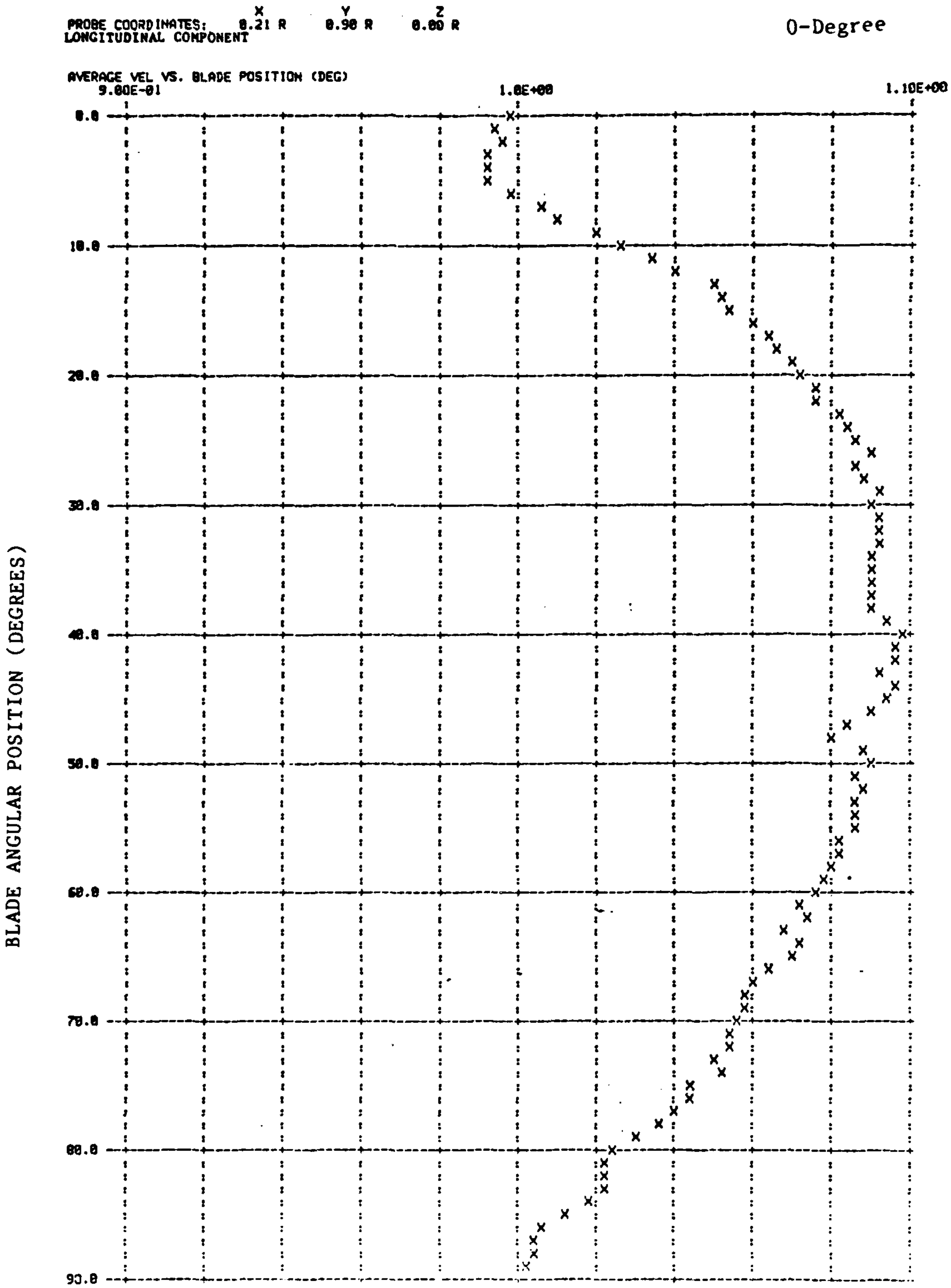
12b - Computer Generated Graph of Velocity vs. Blade Angular Position



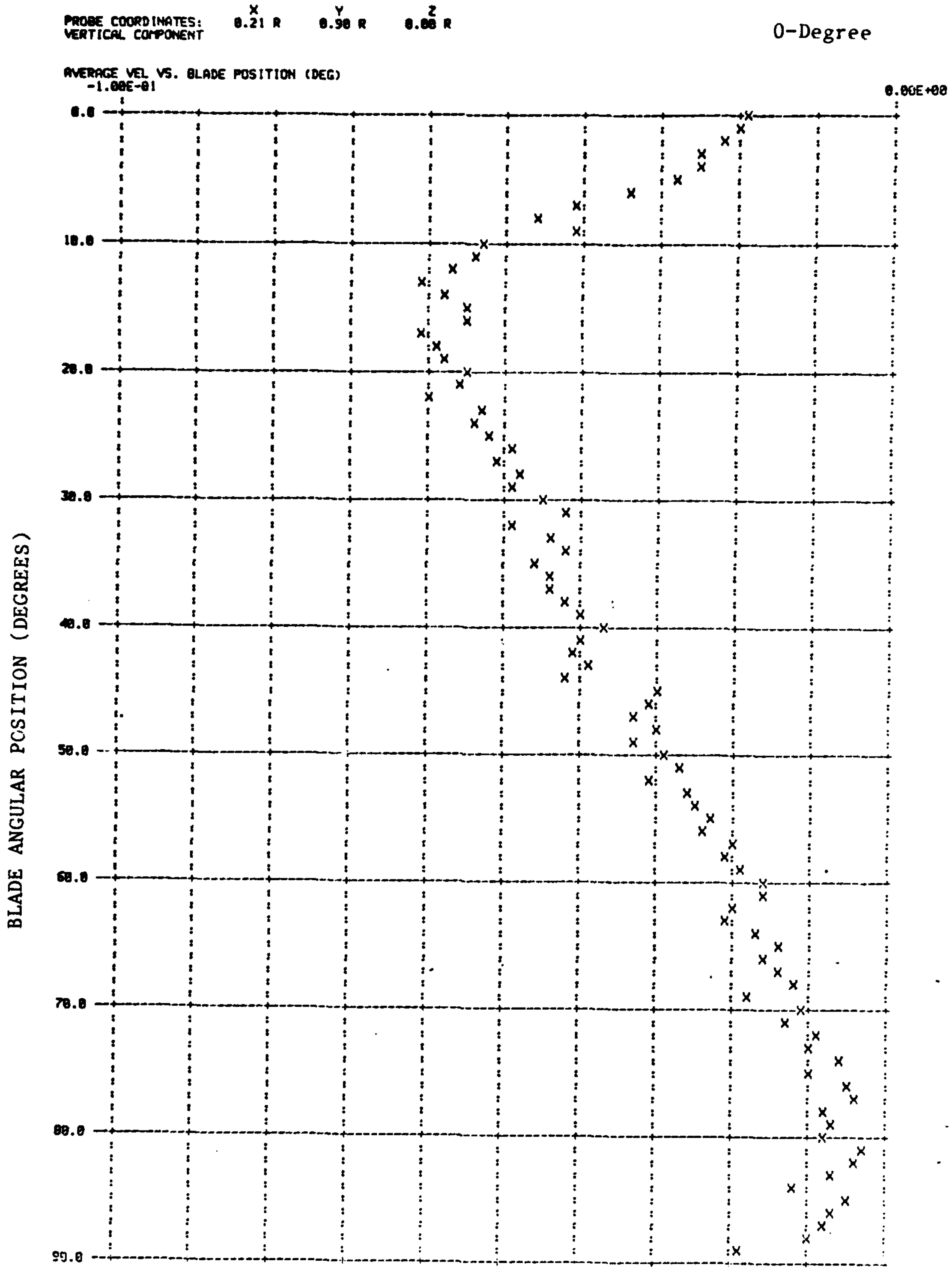
13a - Computer Generated Graph of Velocity vs. Blade Angular Position



13b - Computer Generated Graph of Velocity vs. Blade Angular Position

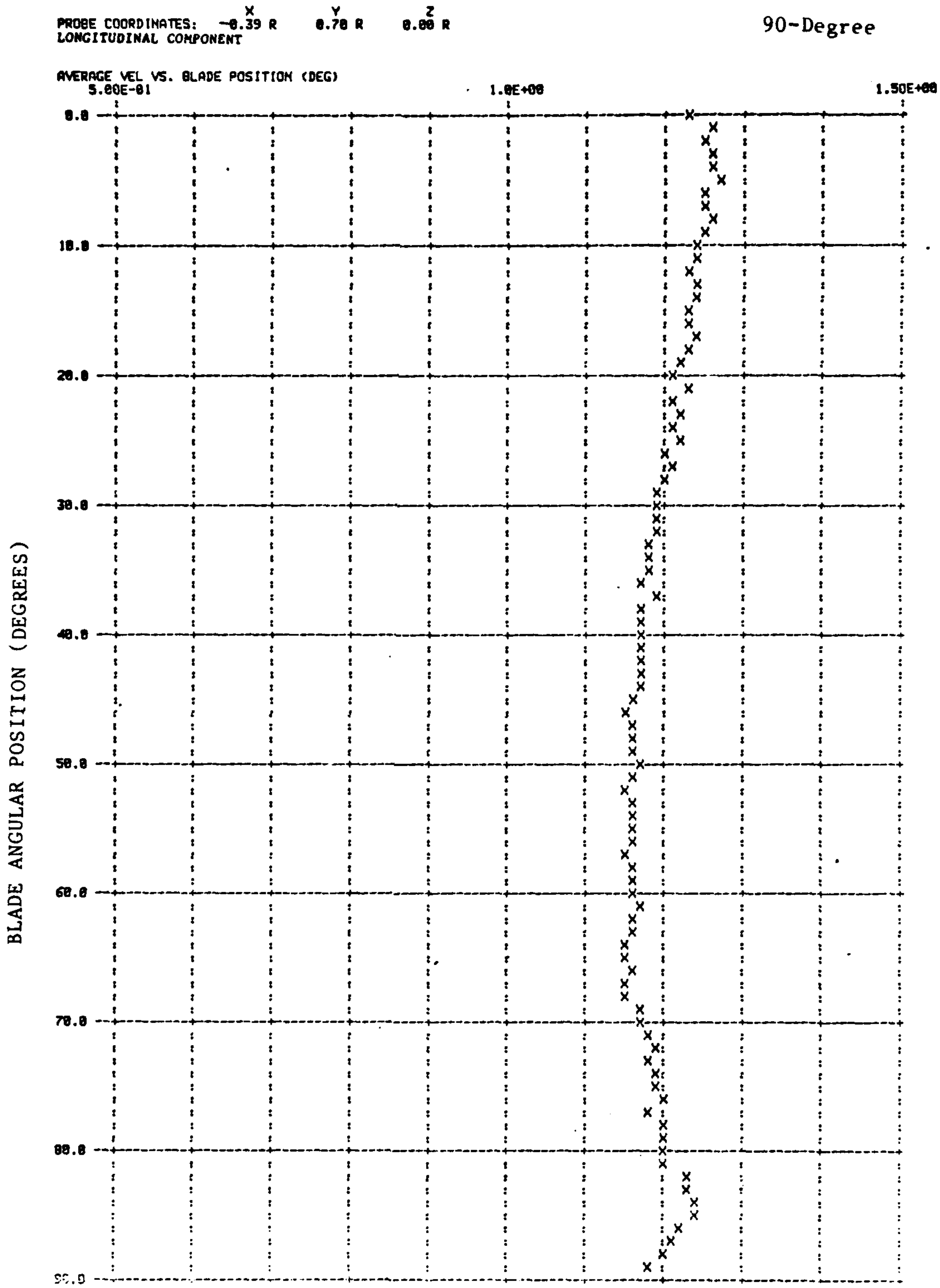


14a - Computer Generated Graph of Velocity vs. Blade Angular Position

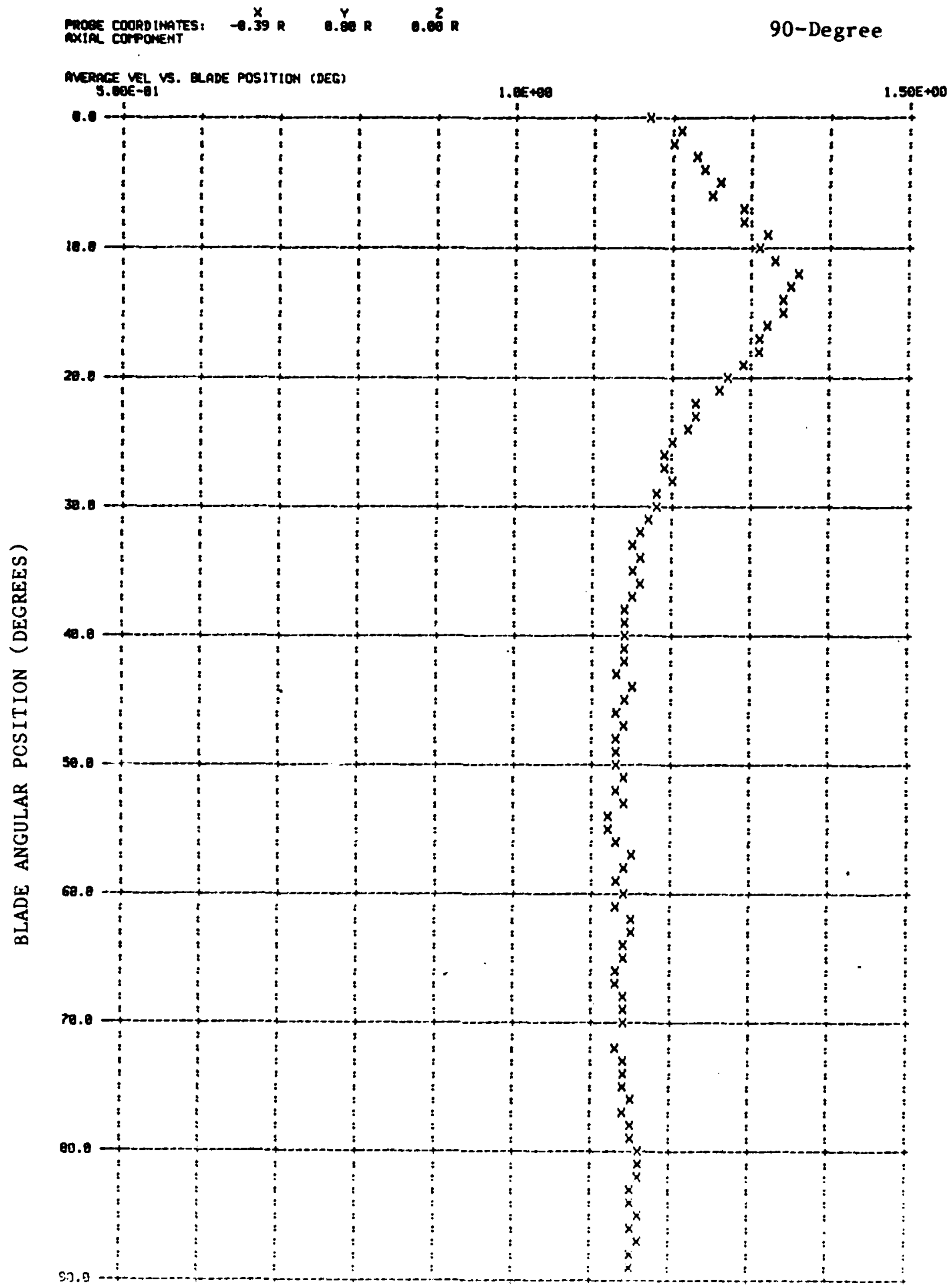


14b - Computer Generated Graph of Velocity vs. Blade Angular Position

90-Degree



15 - Computer Generated Graph of Velocity vs. Blade Angular Position



16 - Computer Generated Graph of Velocity vs. Blade Angular Position

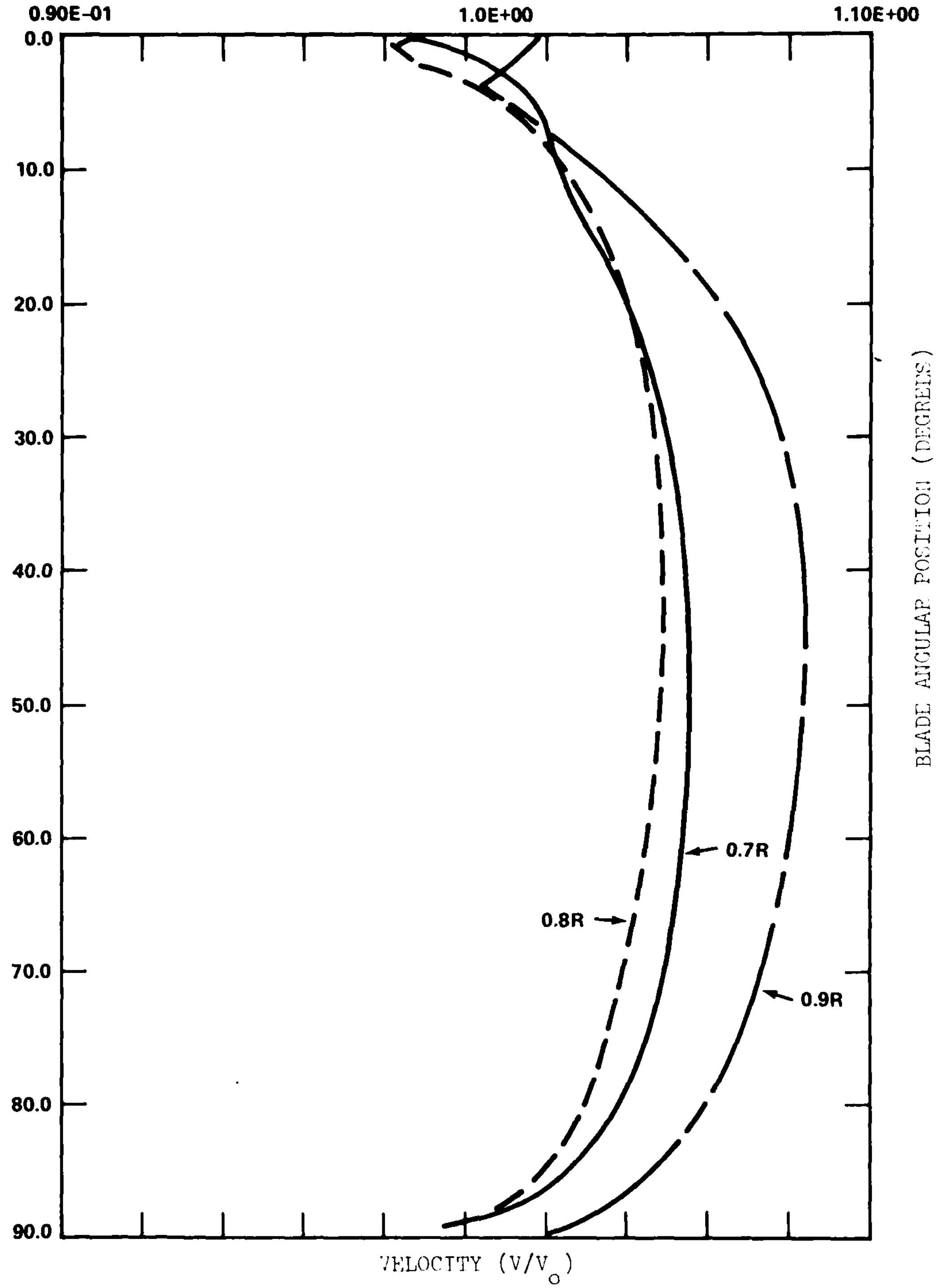


Figure 17 - Three Typical Velocity vs. Blade Angular Position Curves at 0.7, 0.8, and 0.9 radii

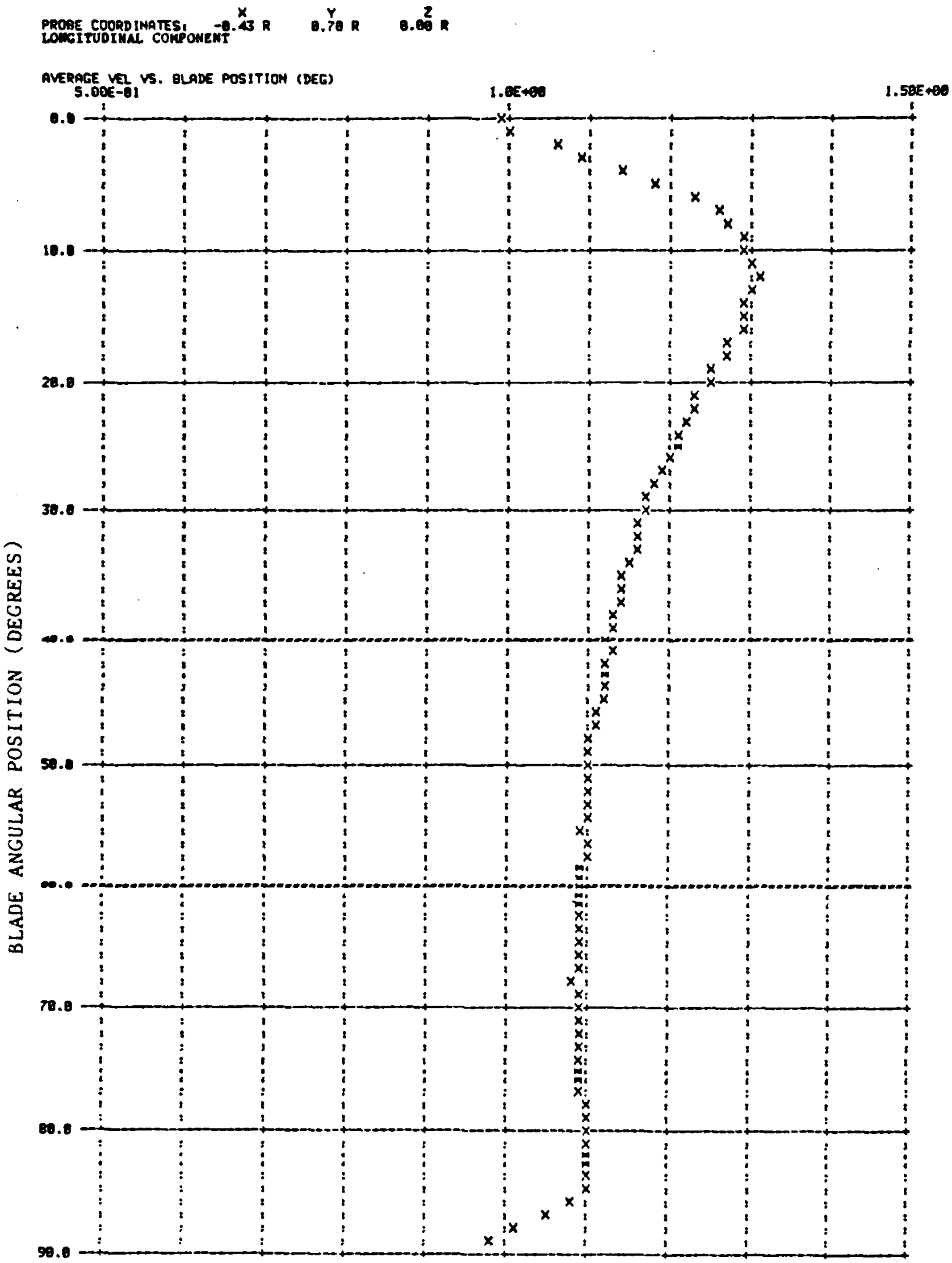


Figure 18a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

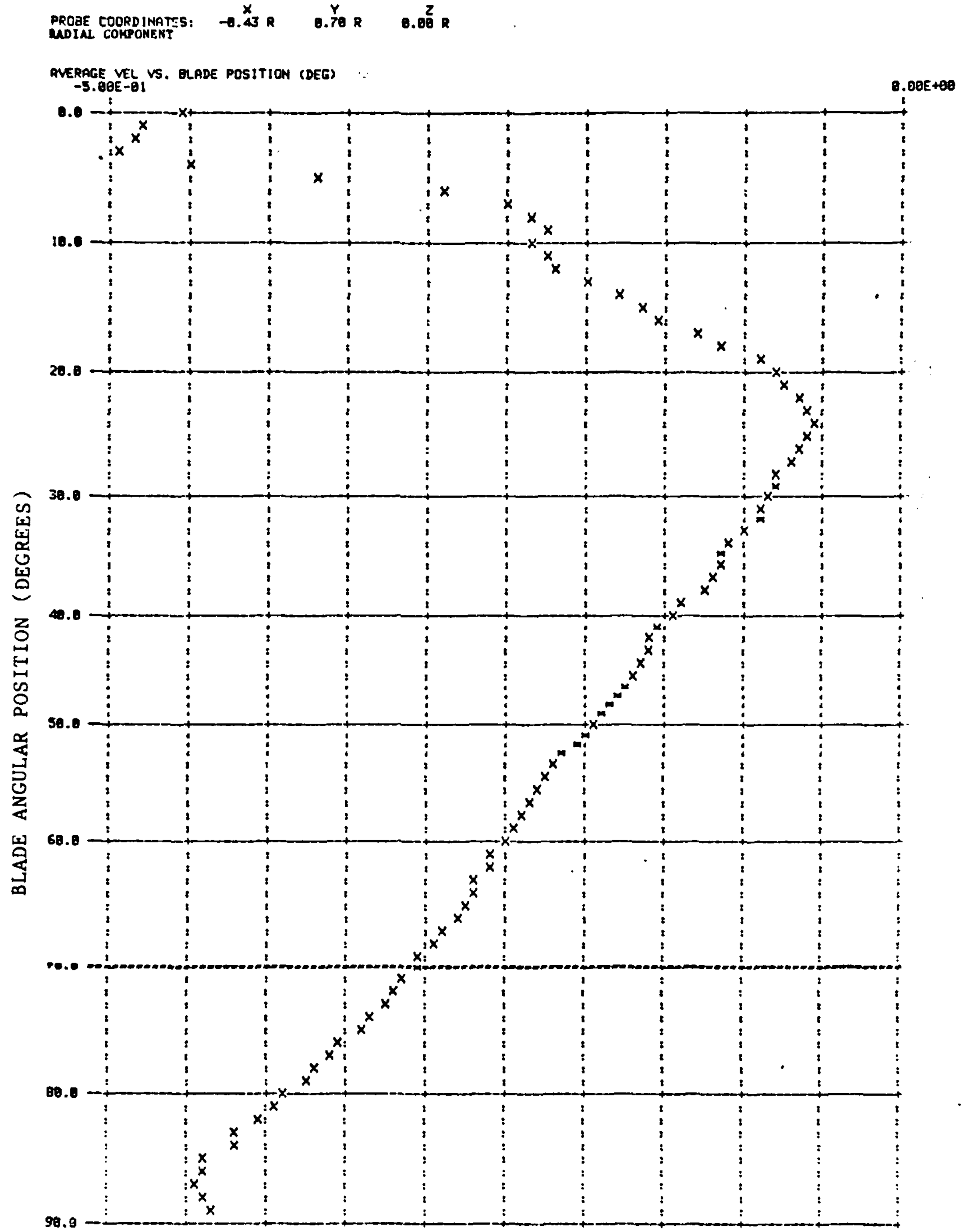


Figure 18b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

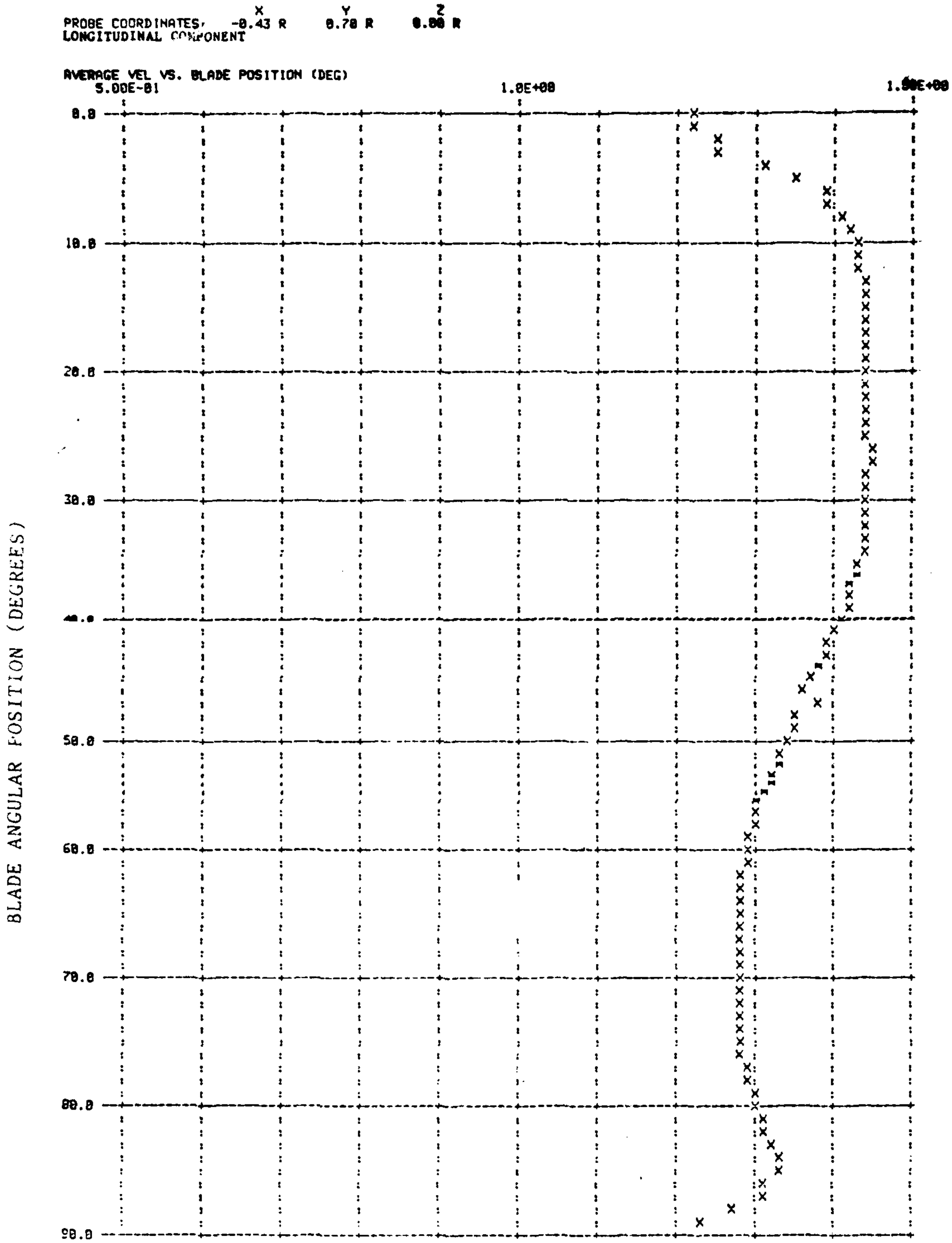


Figure 19a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

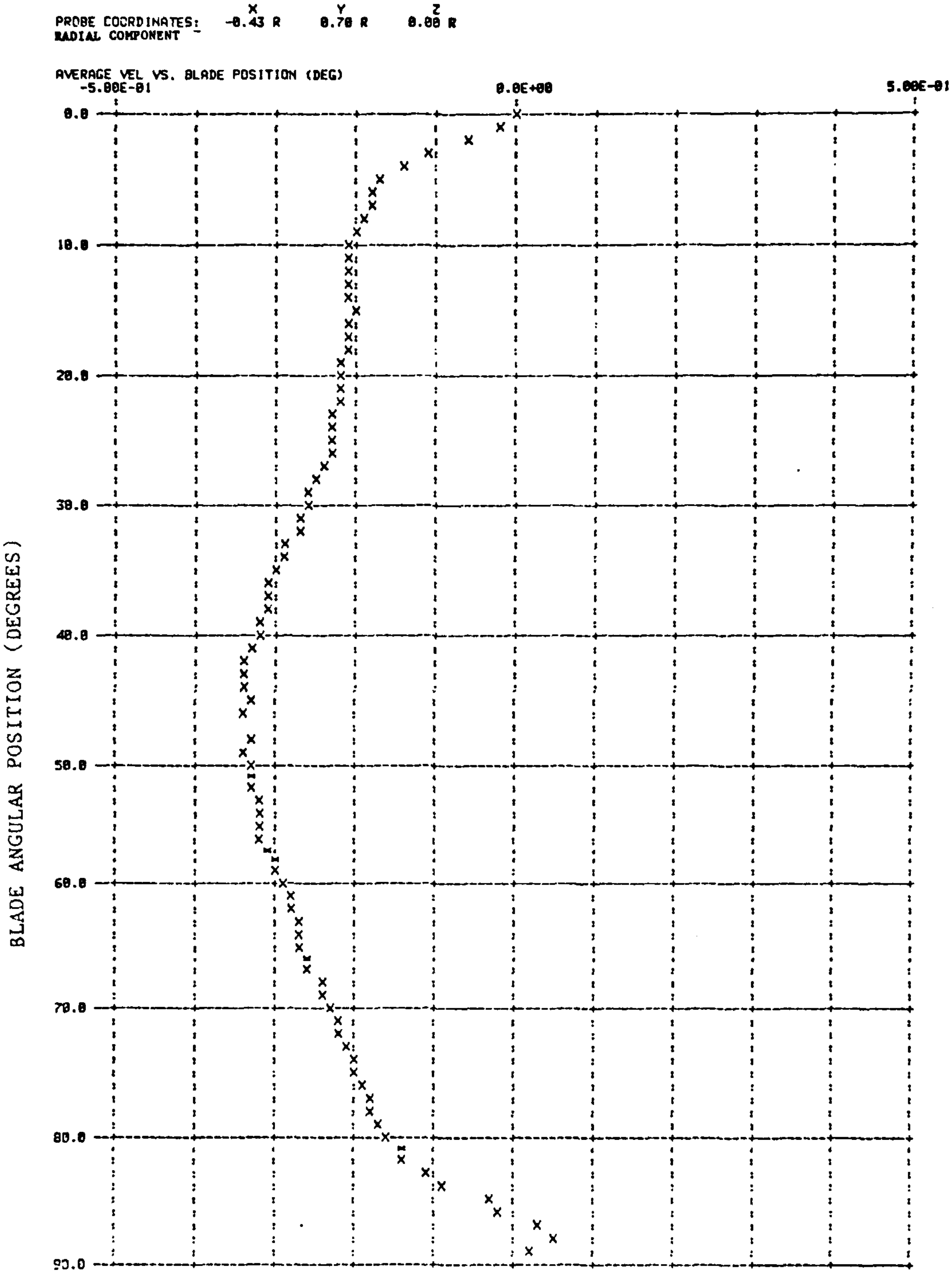


Figure 19b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

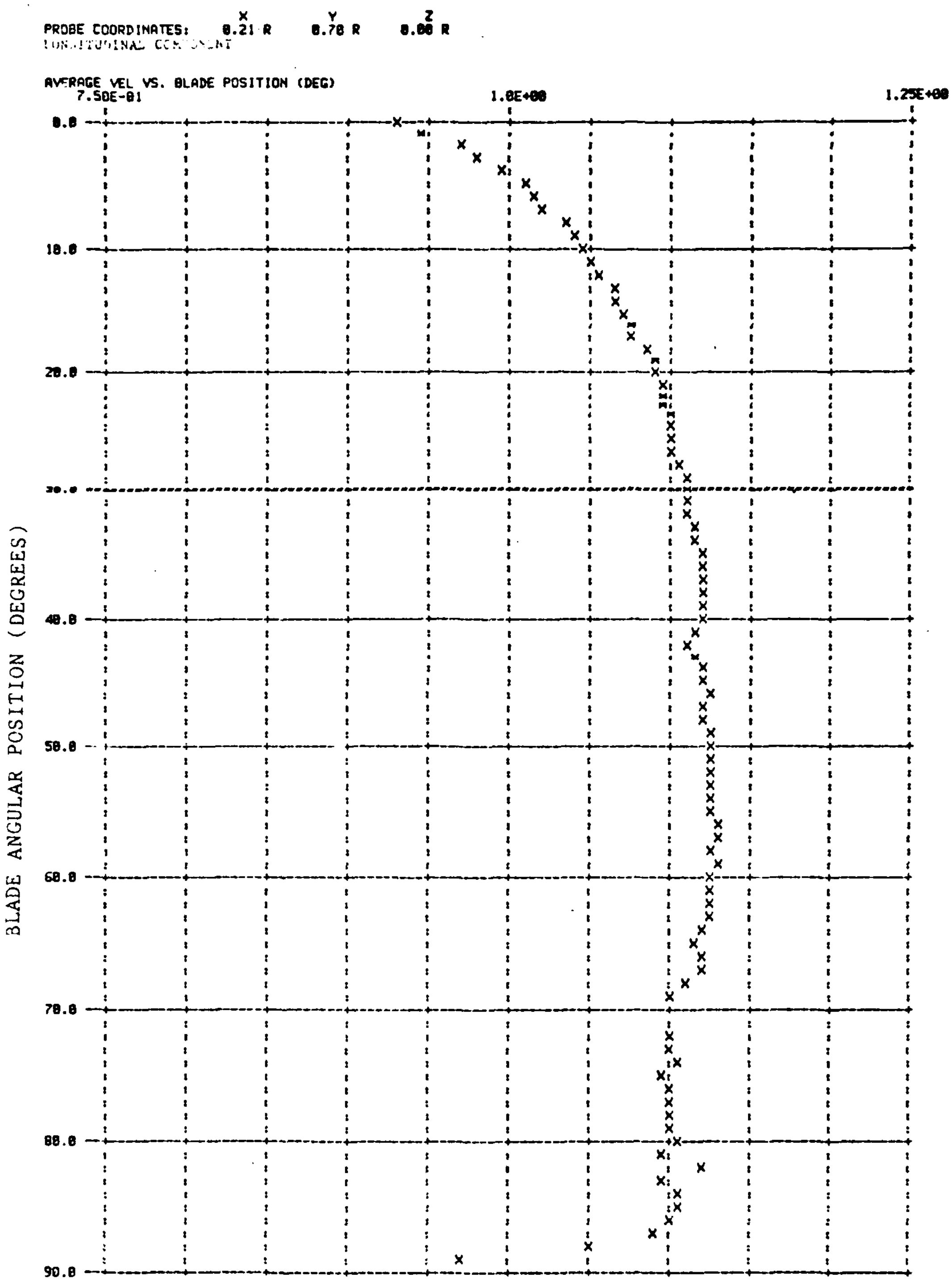


Figure 20a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

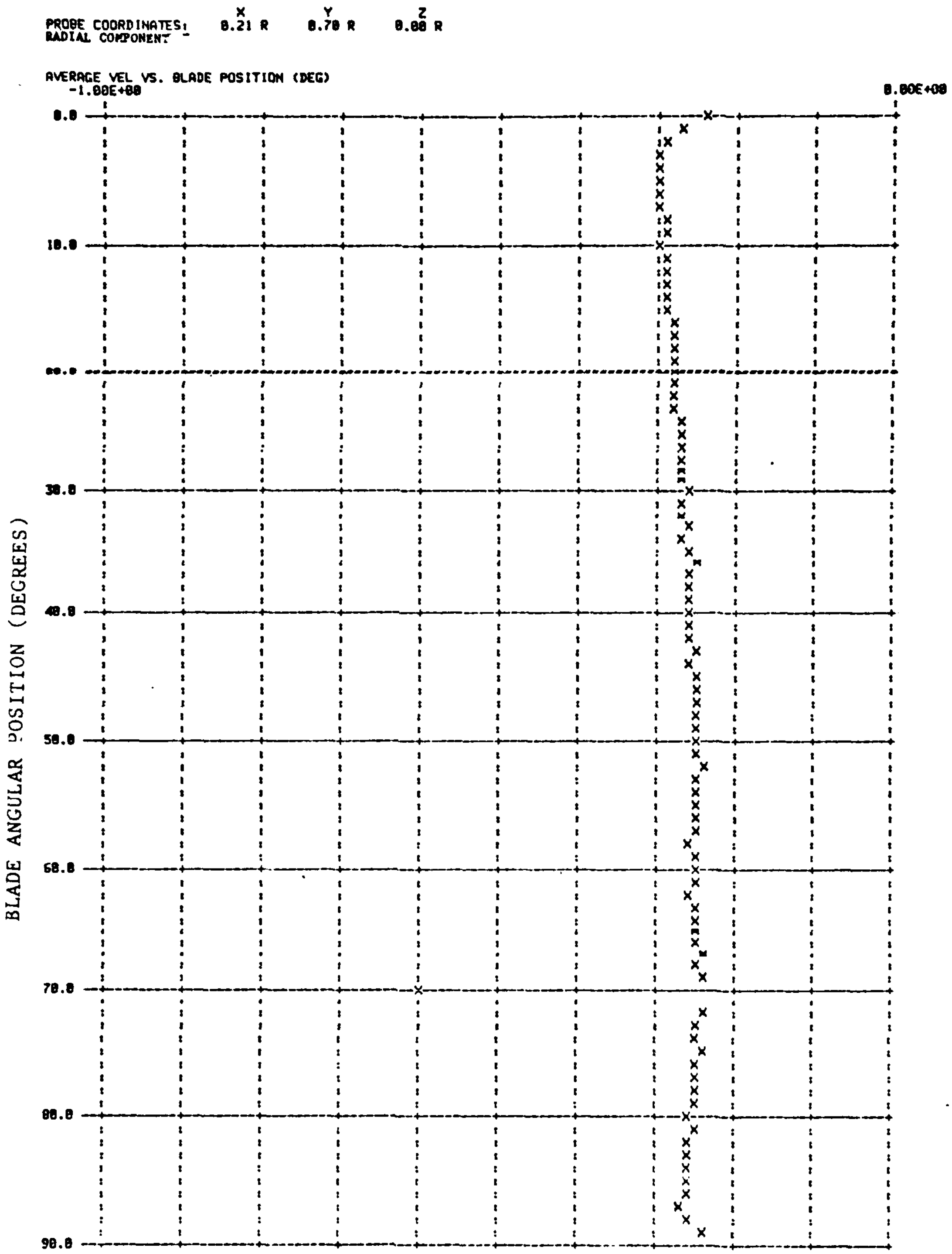


Figure 20b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

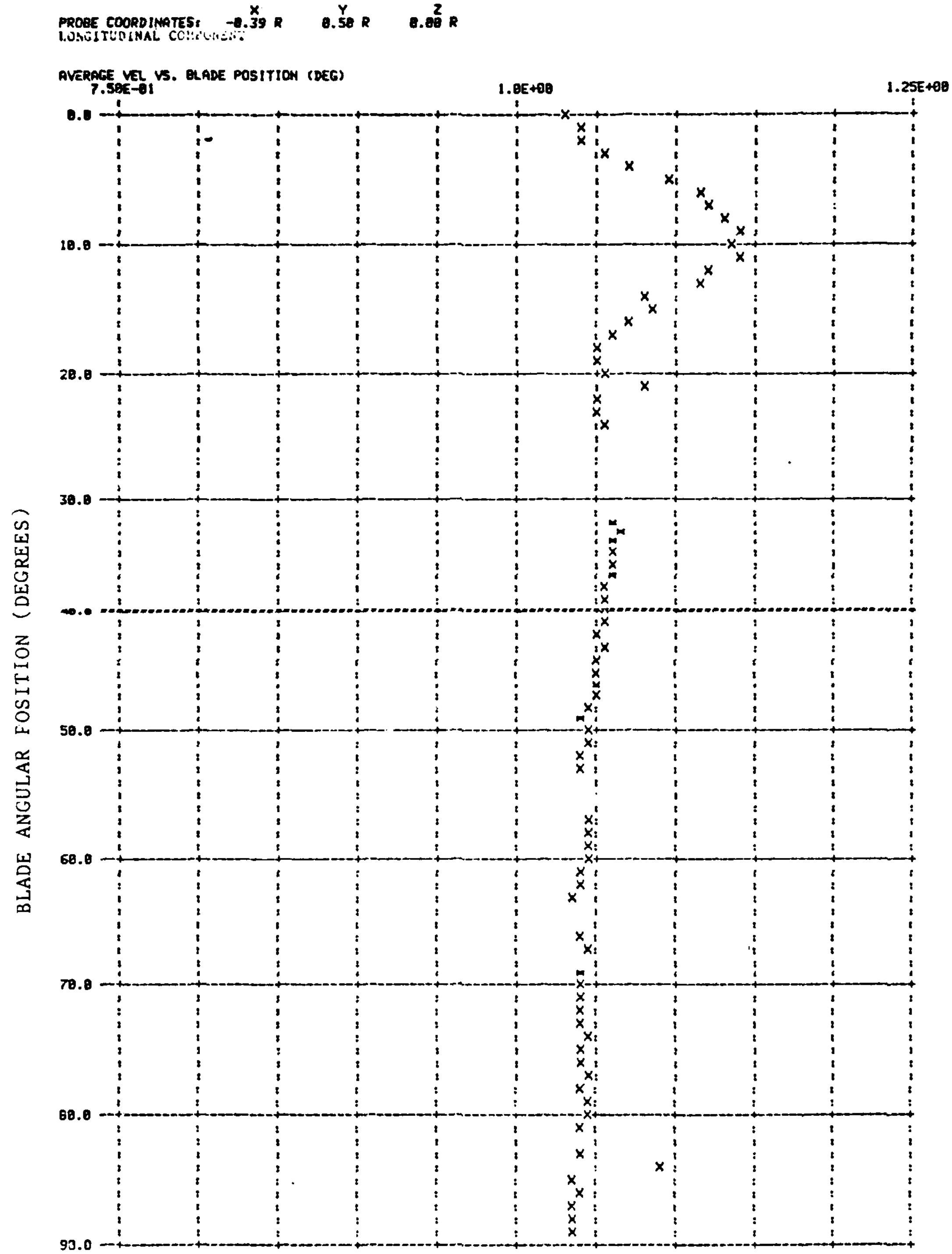


Figure 21a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

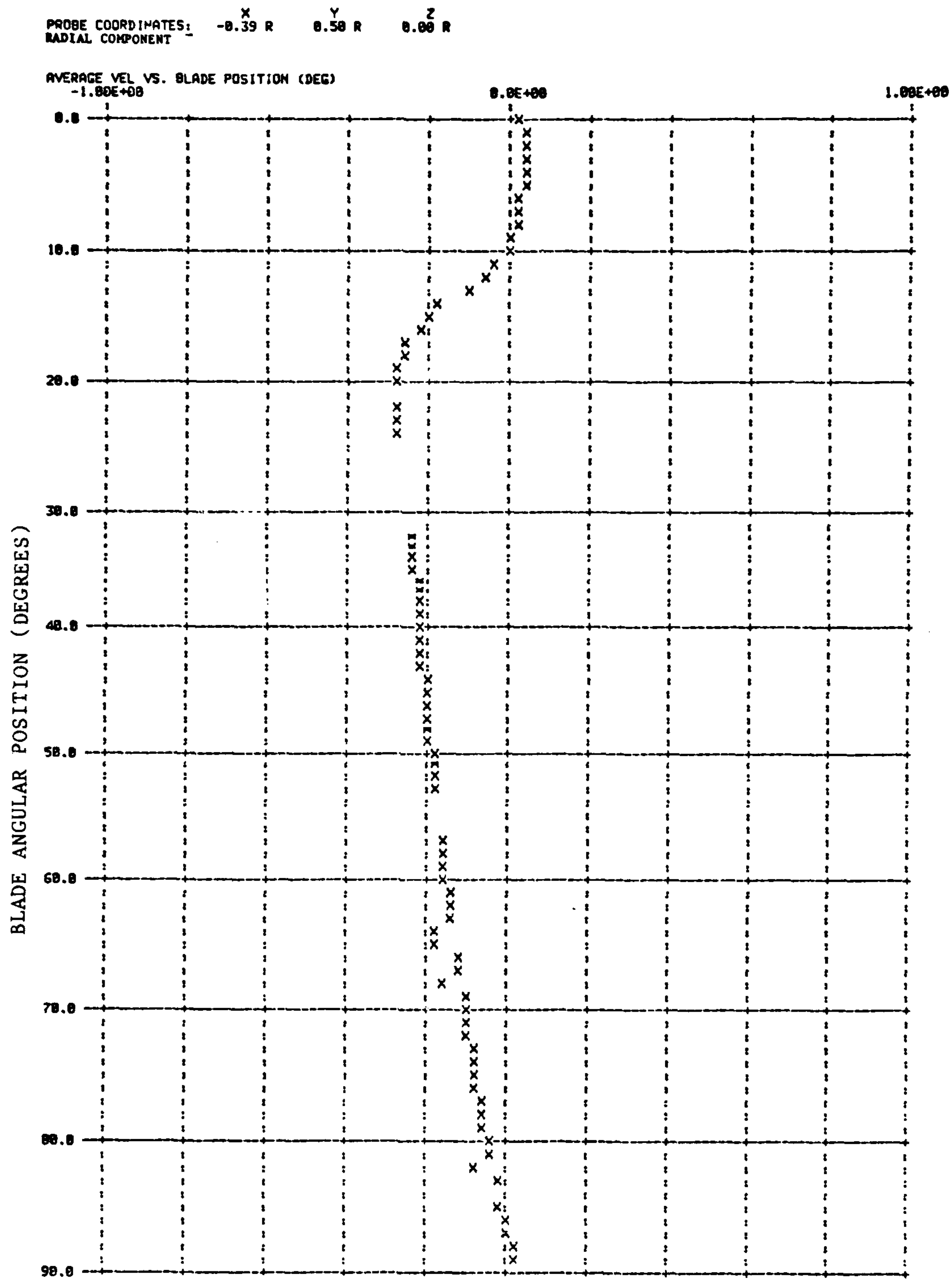


Figure 21b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

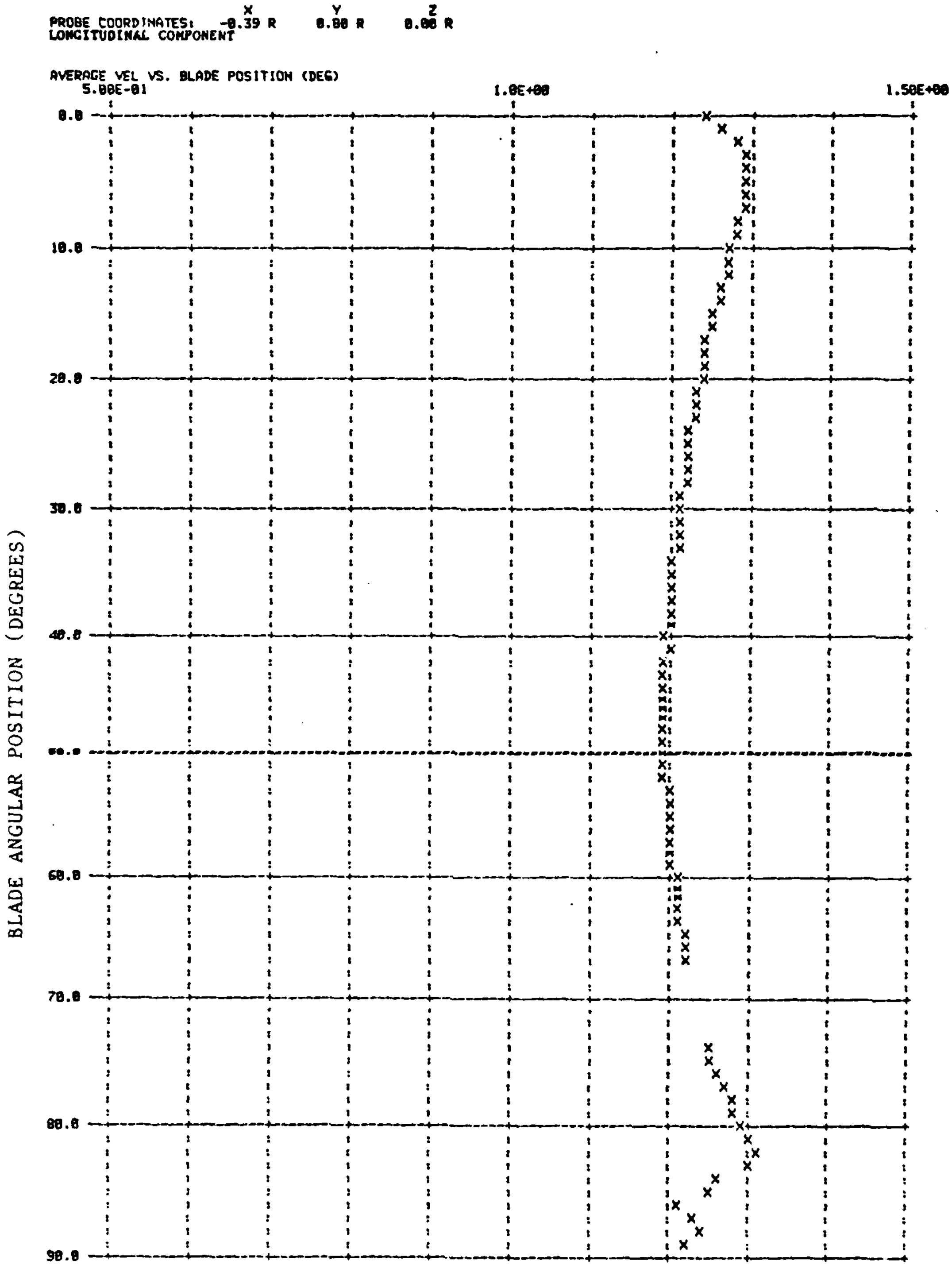


Figure 22a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

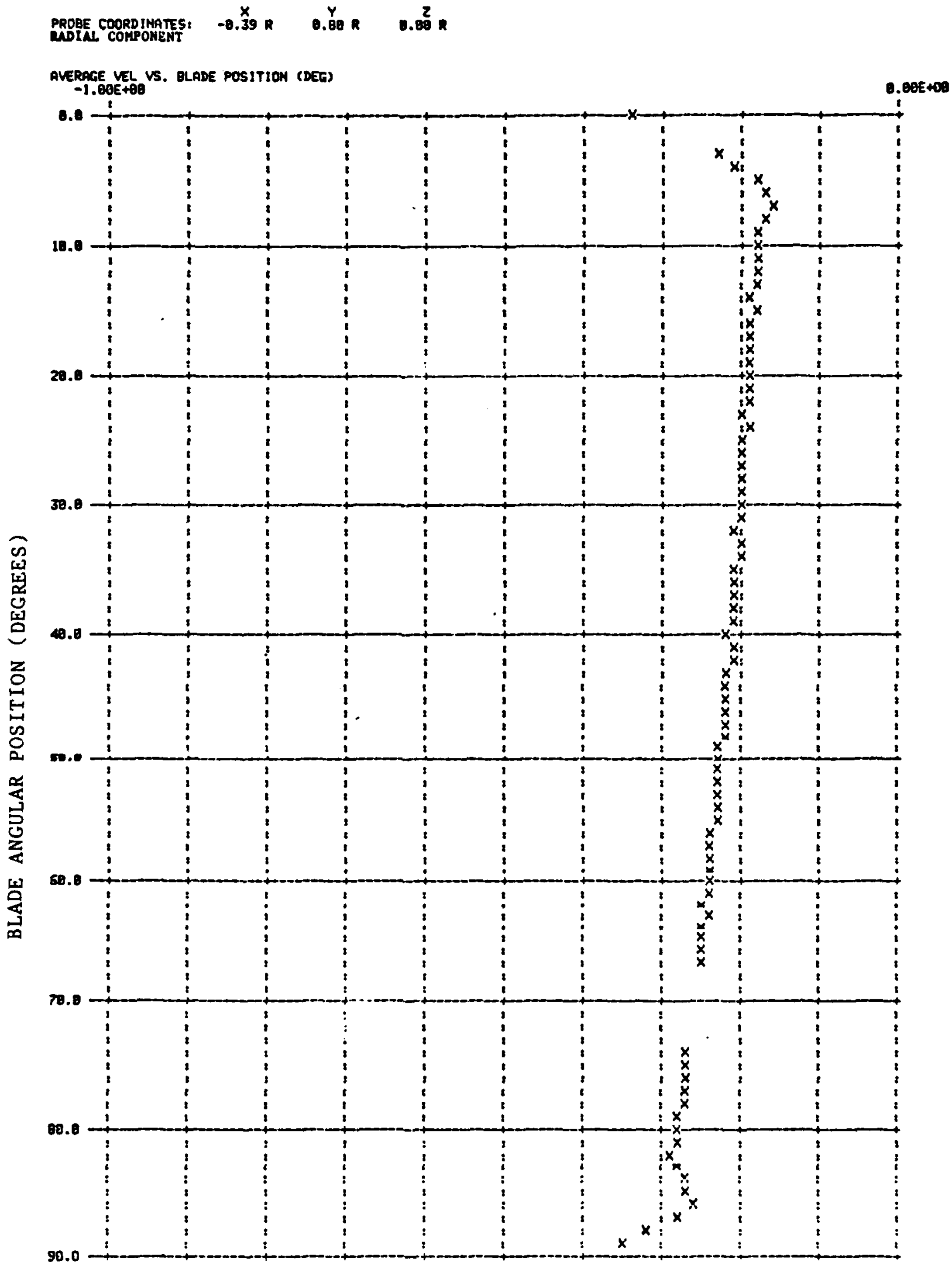


Figure 22b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

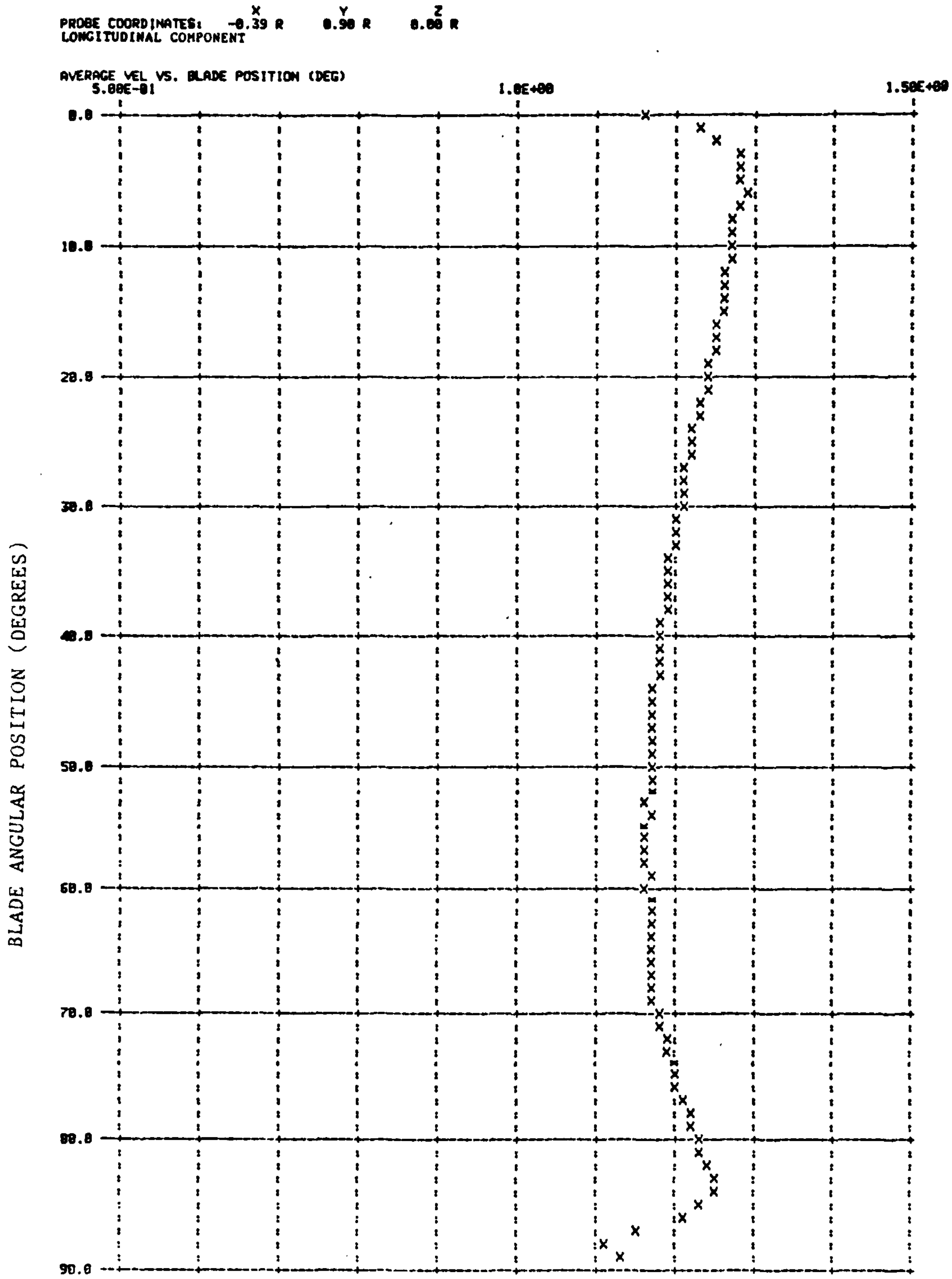


Figure 23a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

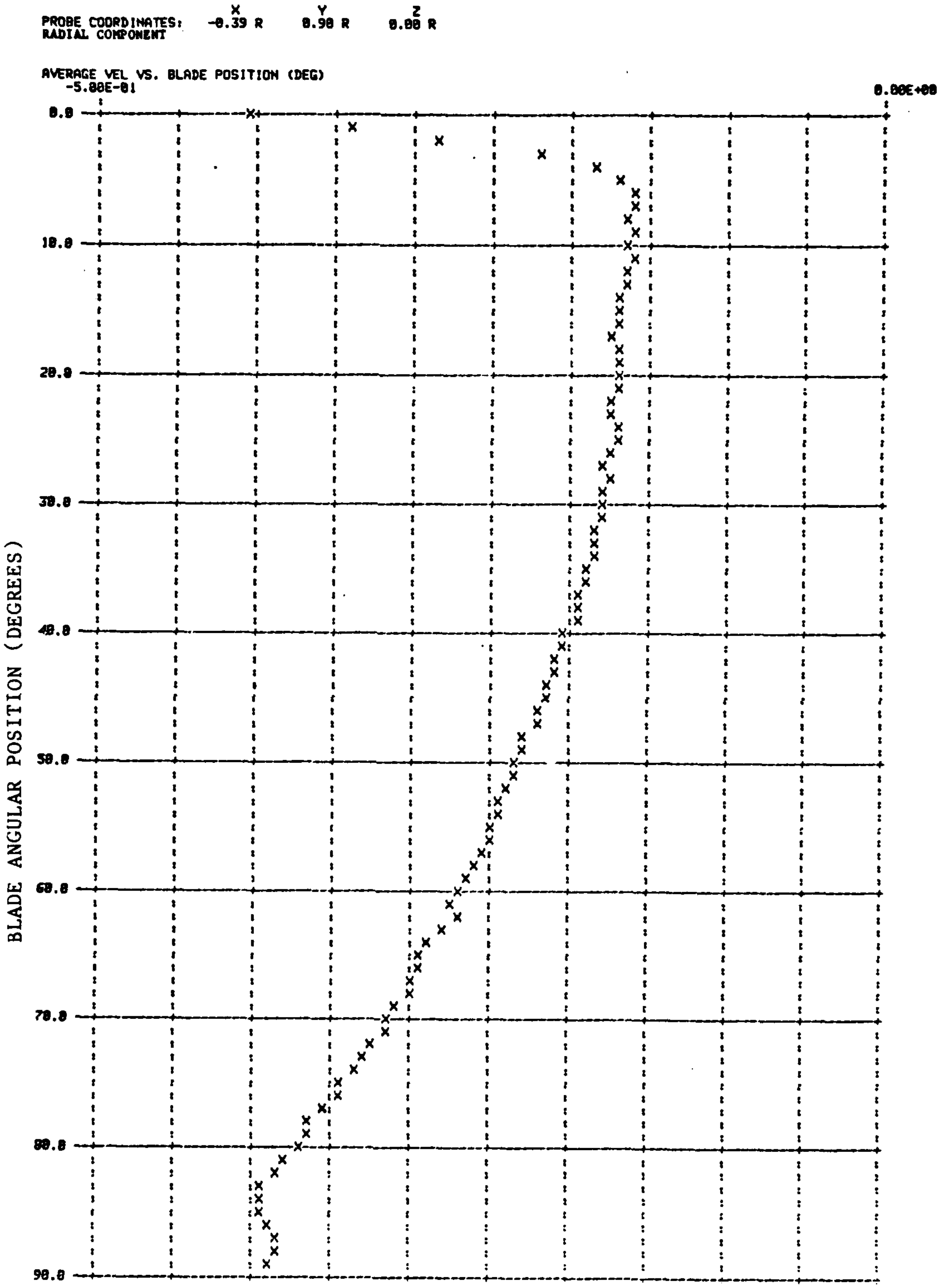


Figure 23b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

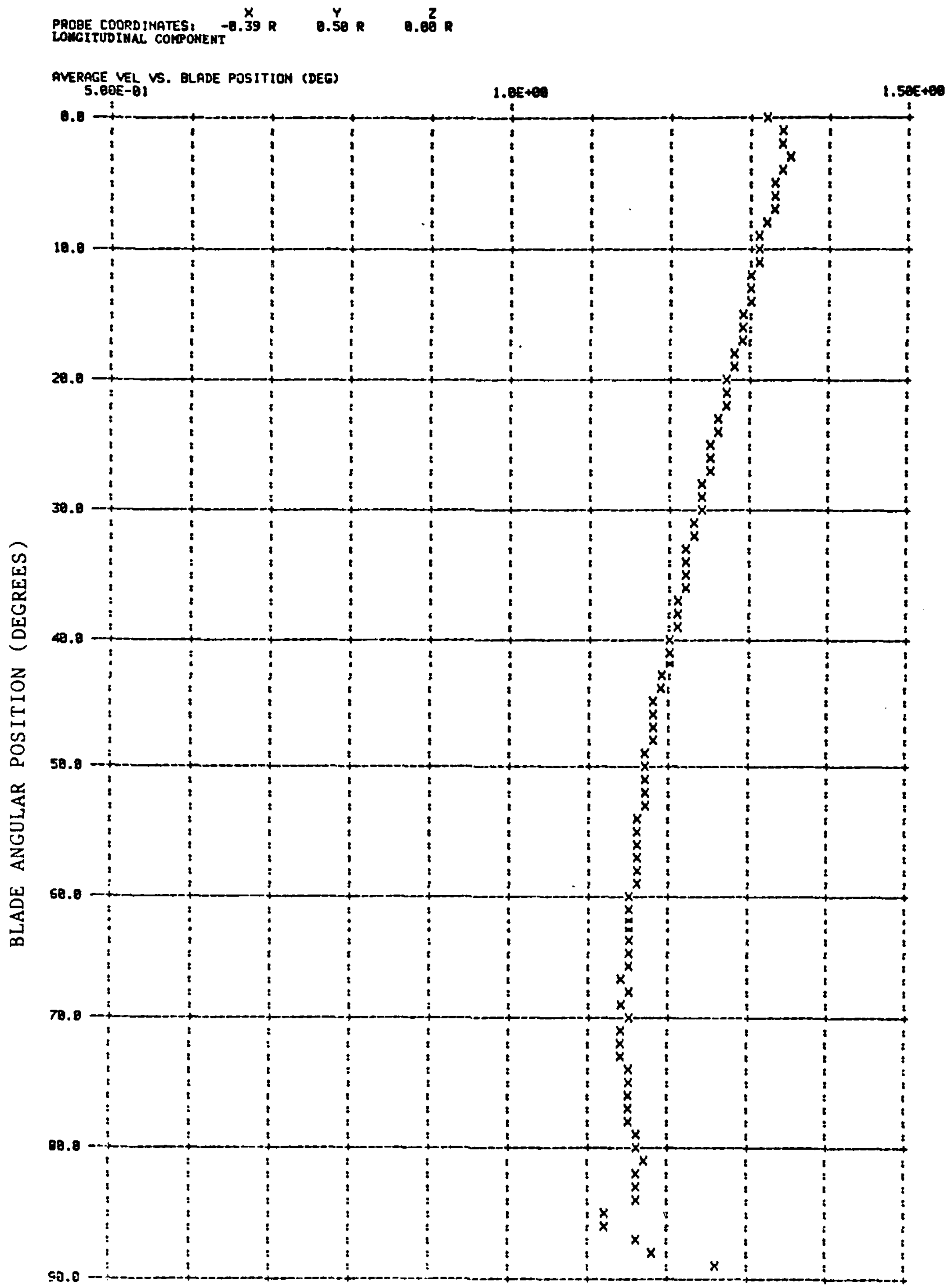


Figure 24a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

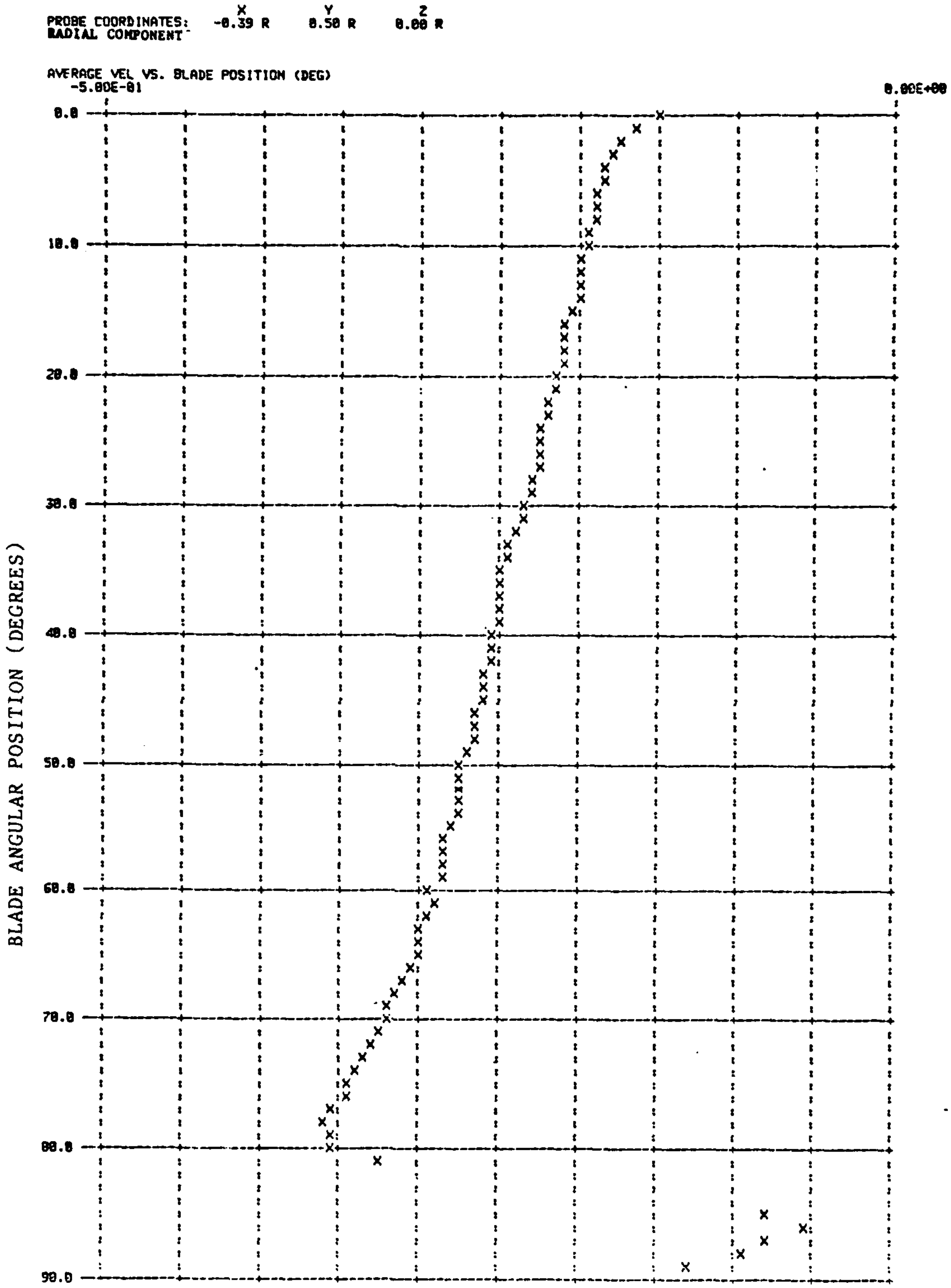


Figure 24b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

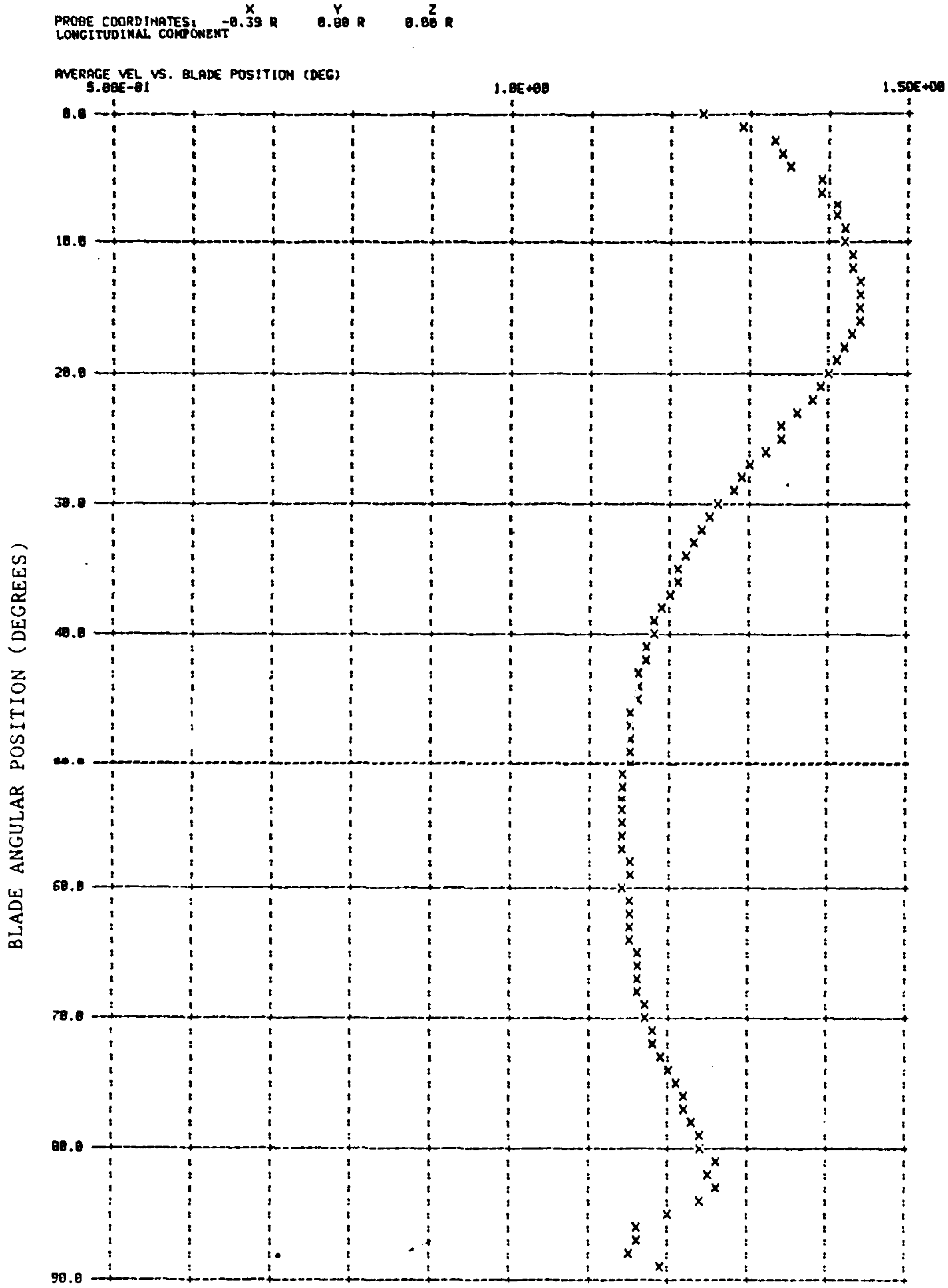


Figure 25a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

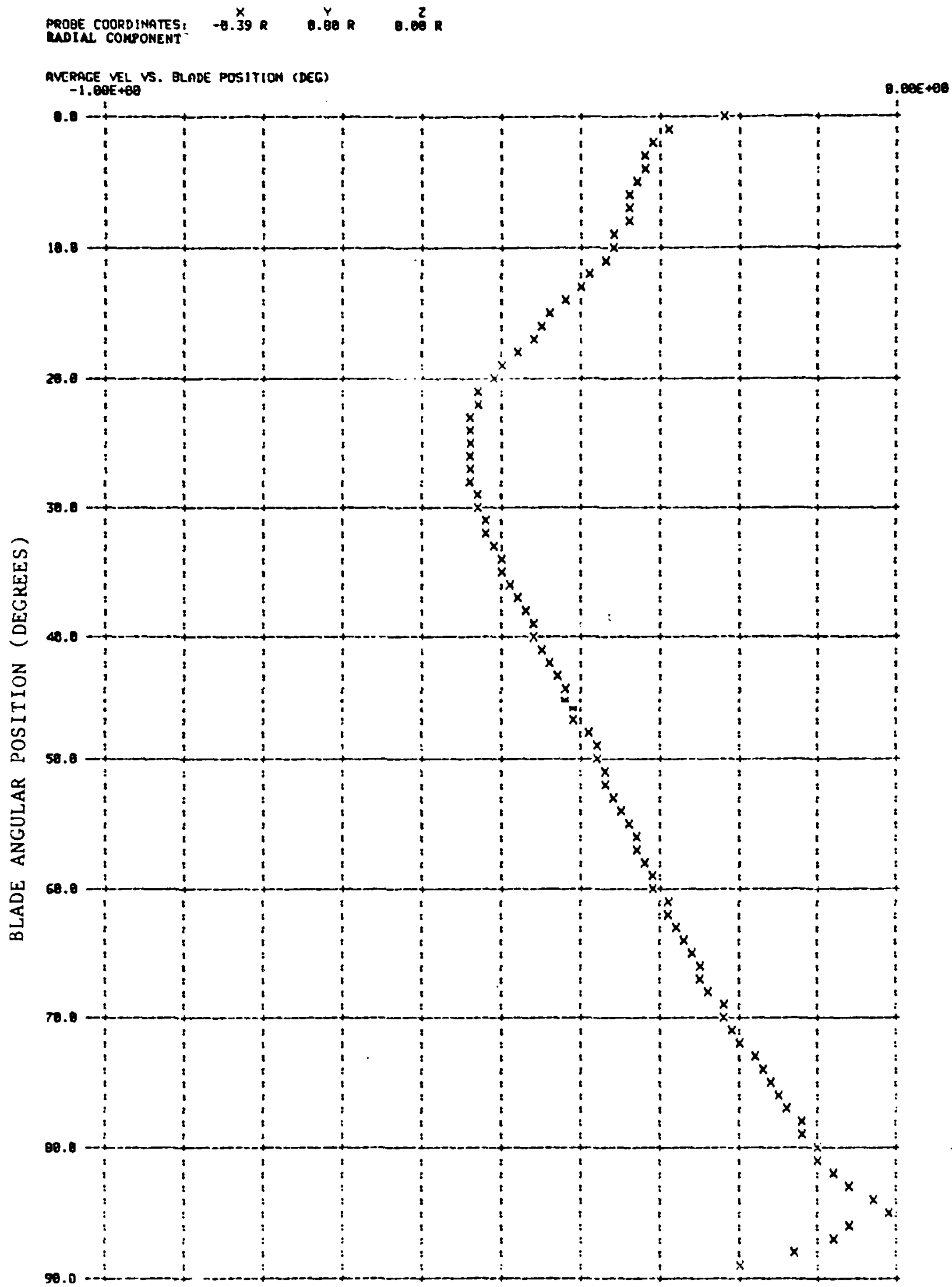


Figure 25b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

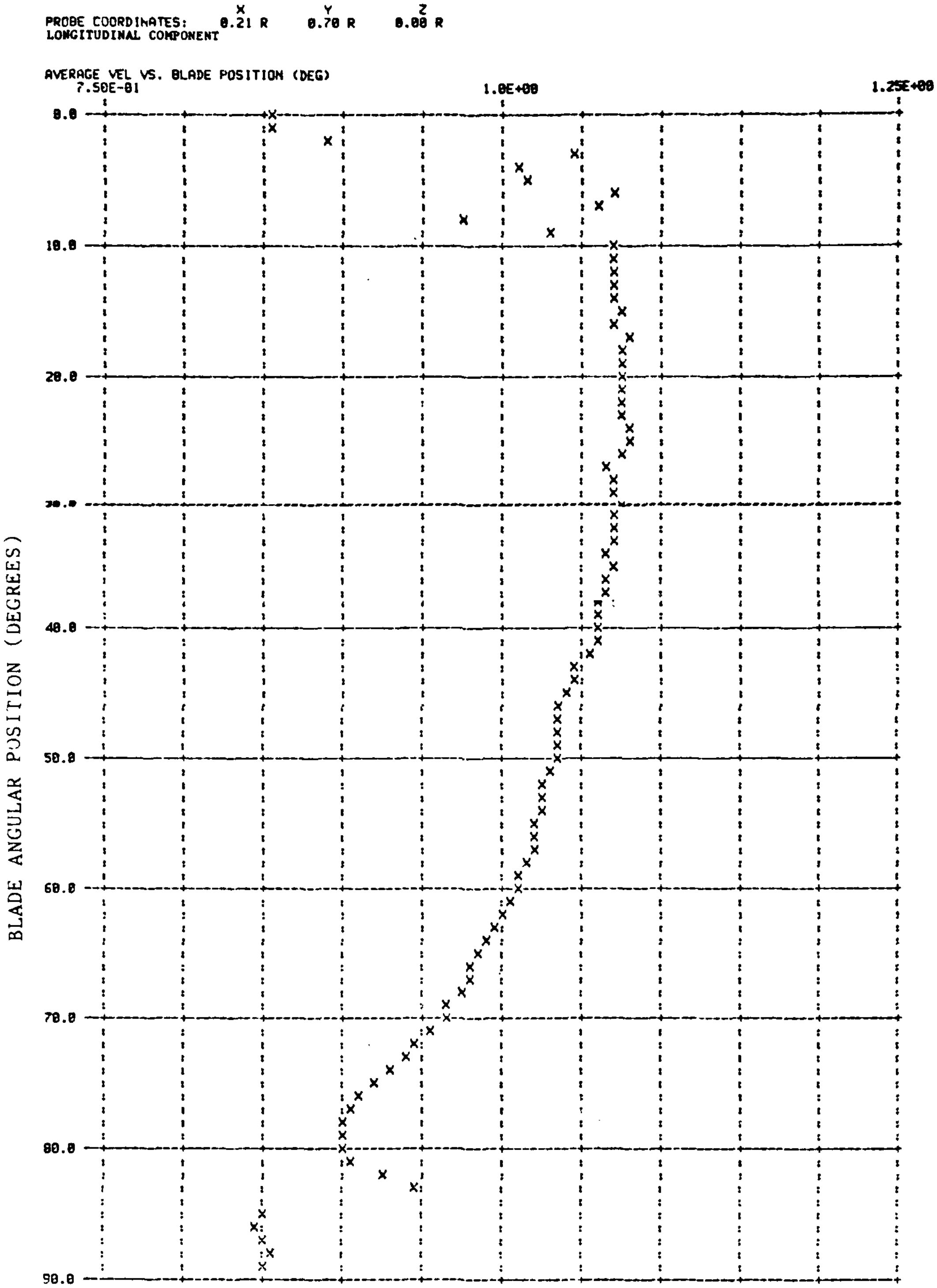


Figure 26a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

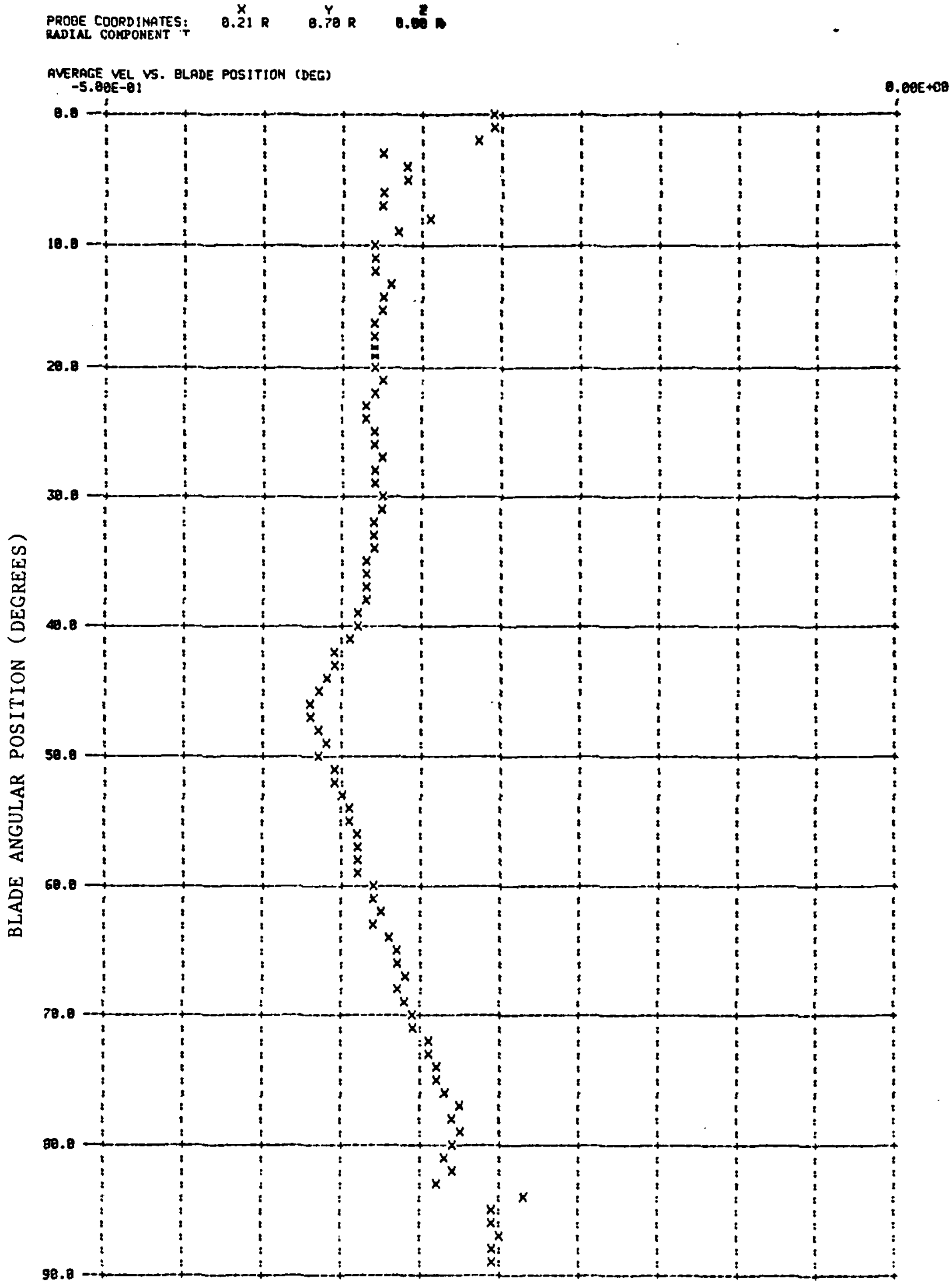


Figure 26b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

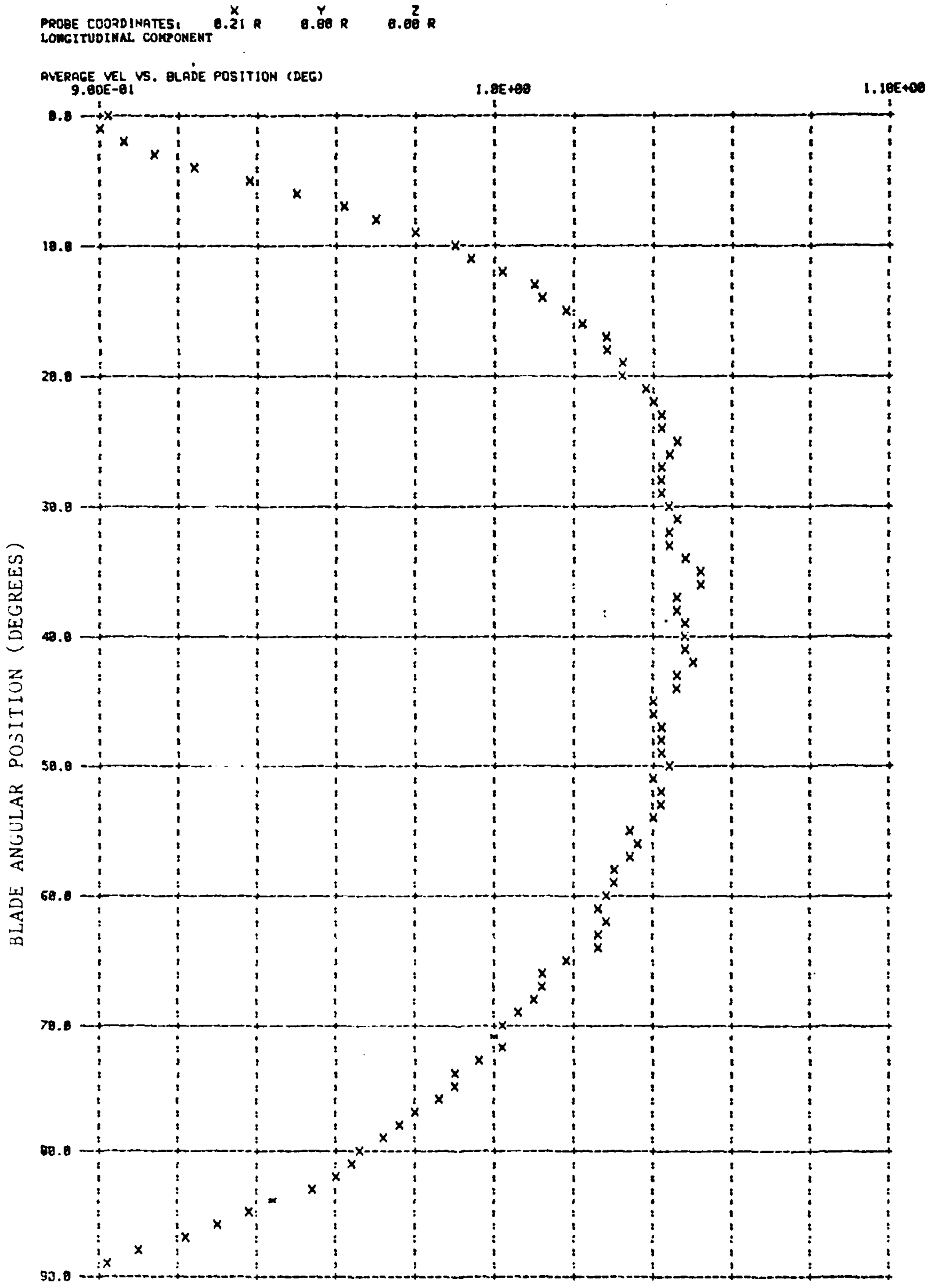


Figure 27a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

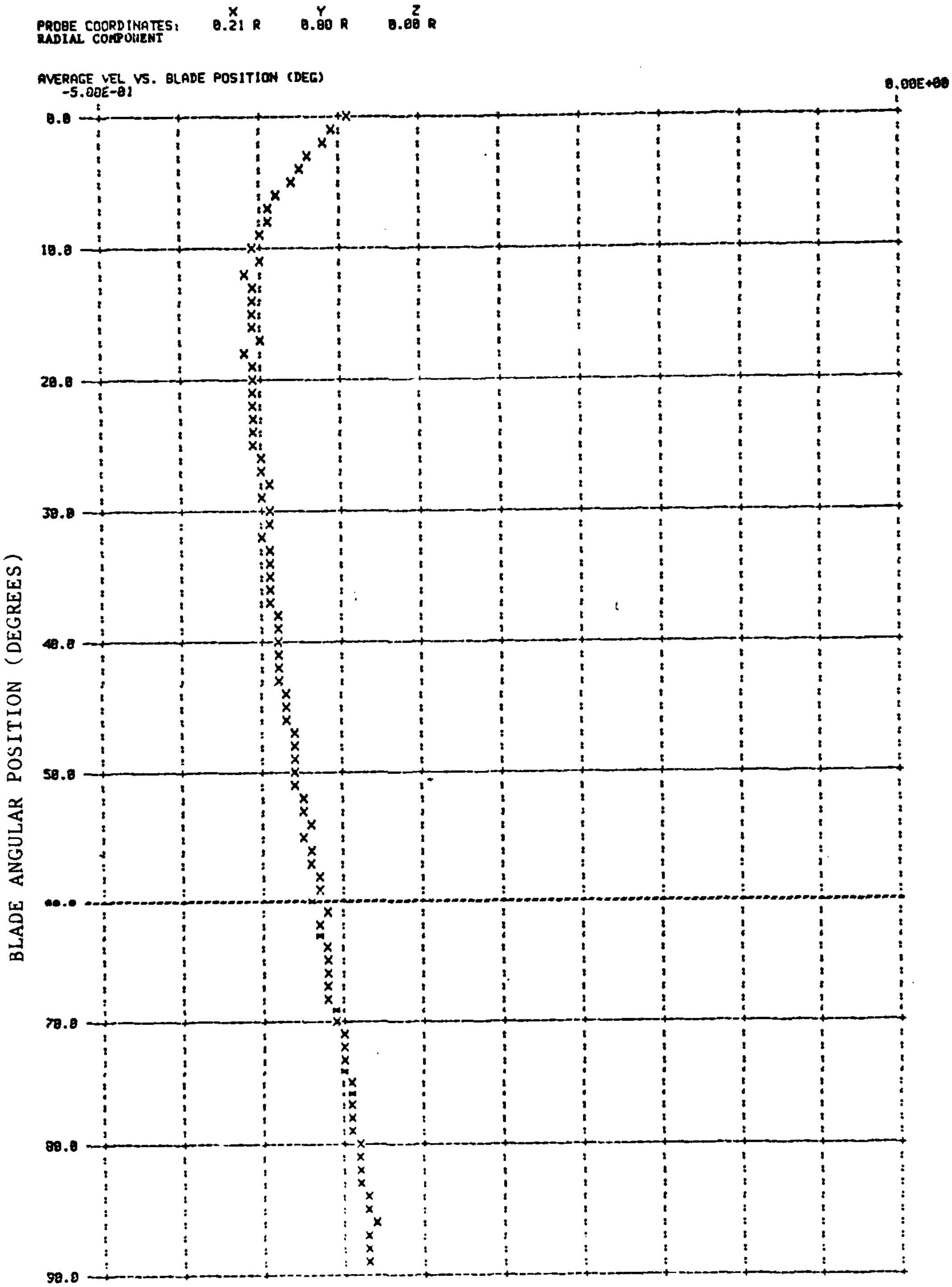


Figure 27b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

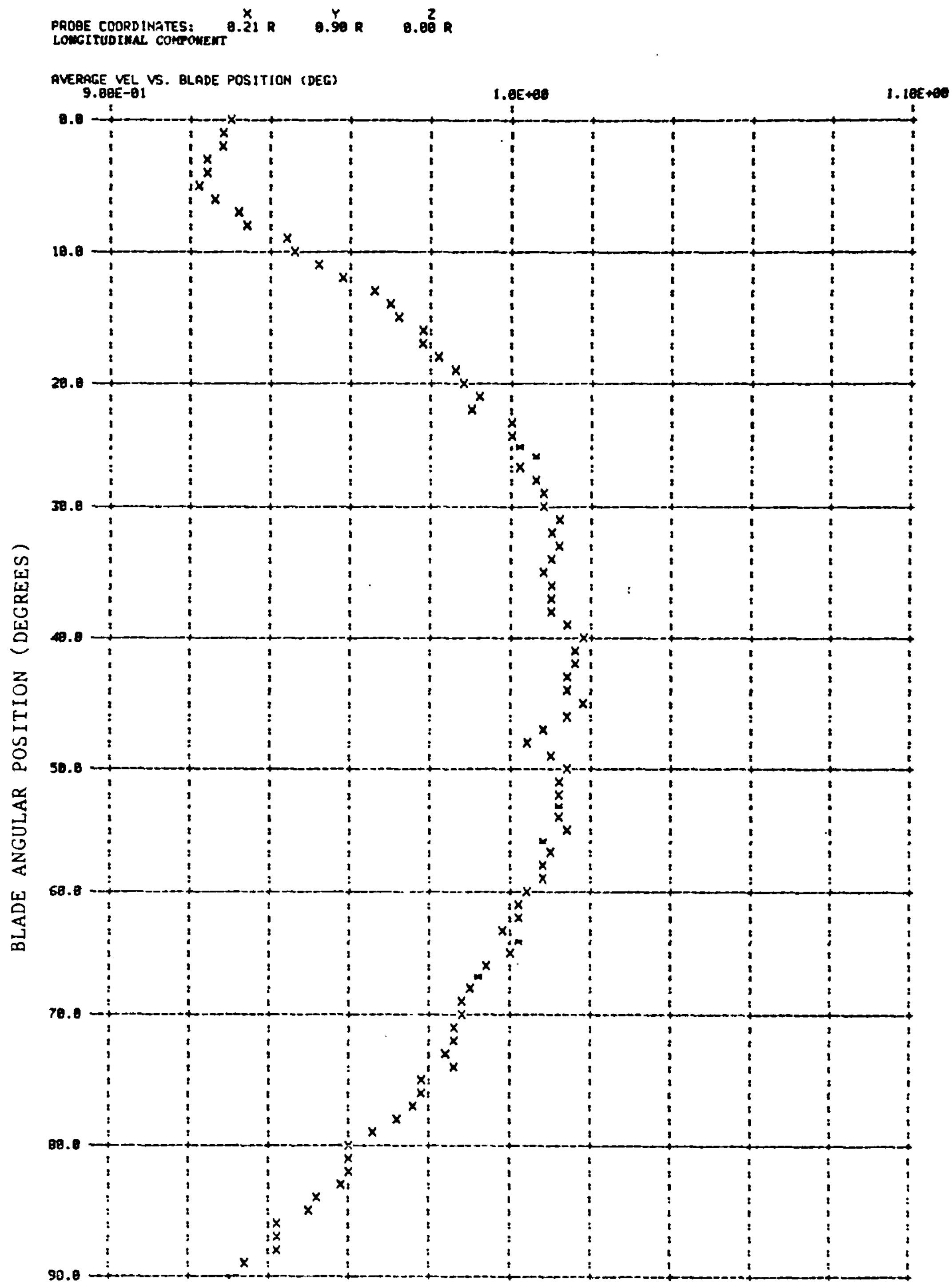


Figure 28a - Computer Generated Graph of Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

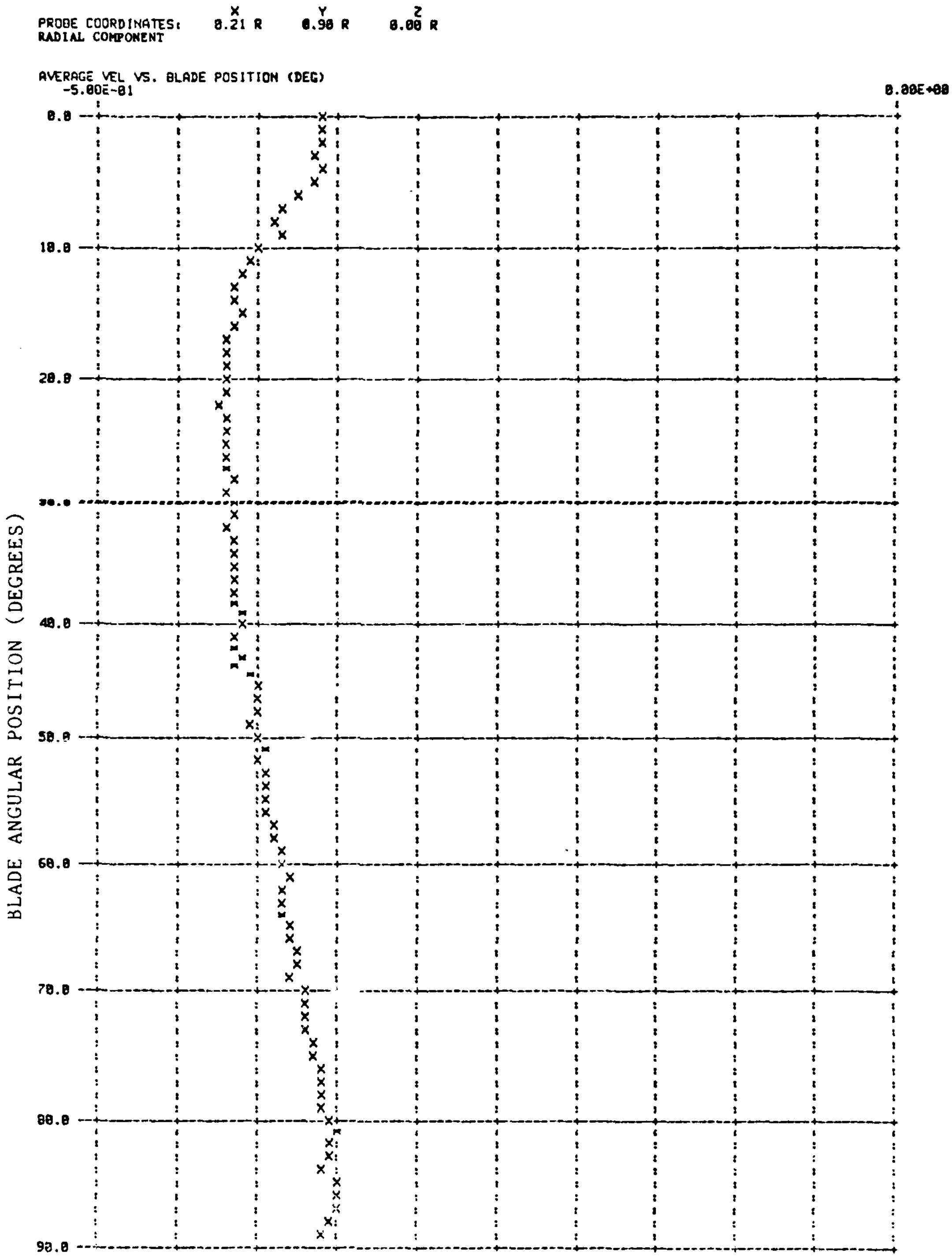


Figure 28b - Computer Generated Graph of RMS Velocity vs. Blade Angular Position Resolved Along Shaft Coordinate System

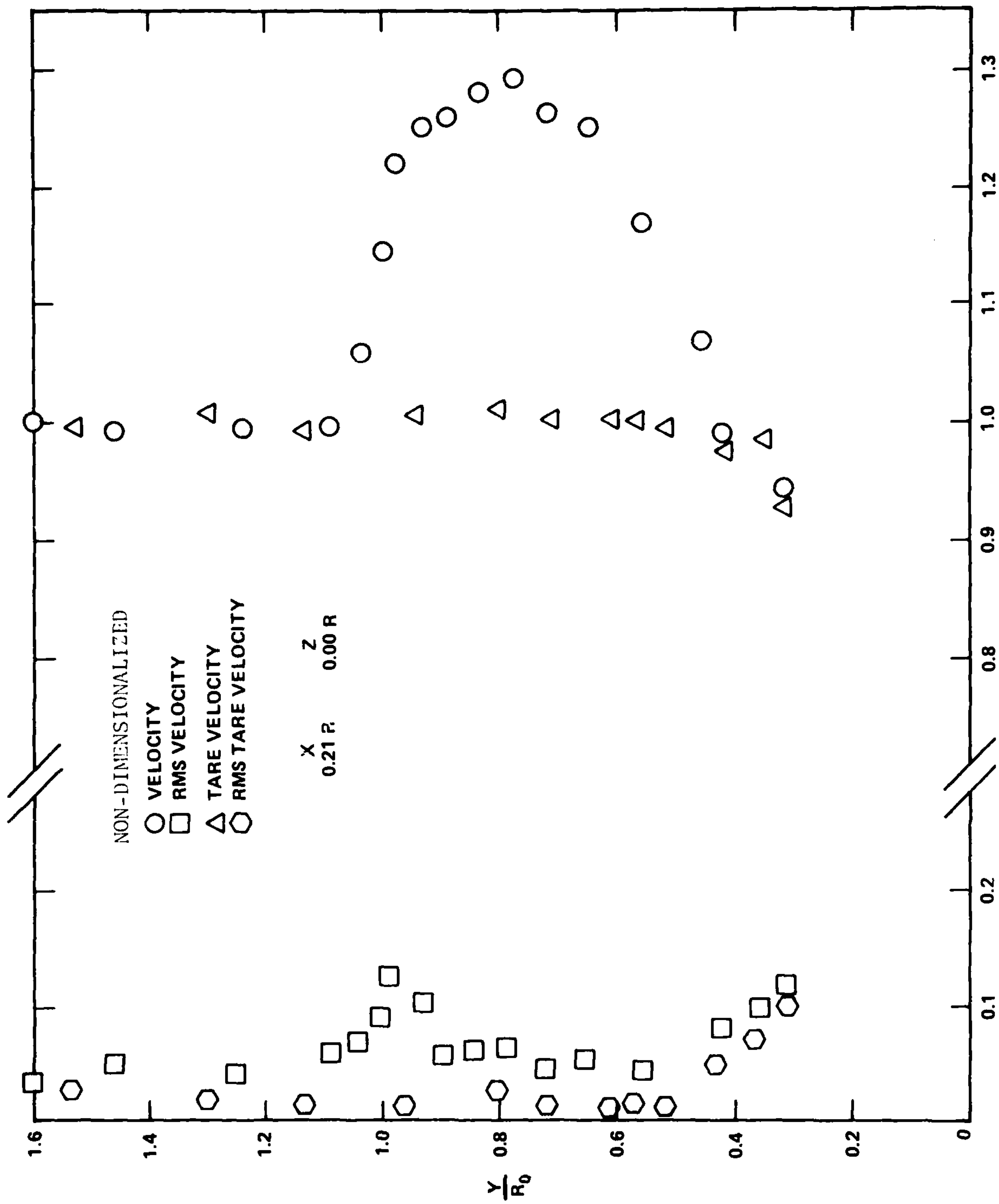


Figure 29 - Time Averaged Longitudinal Velocity and Rms Velocity Data at Shaft Inclination of 20 Degrees

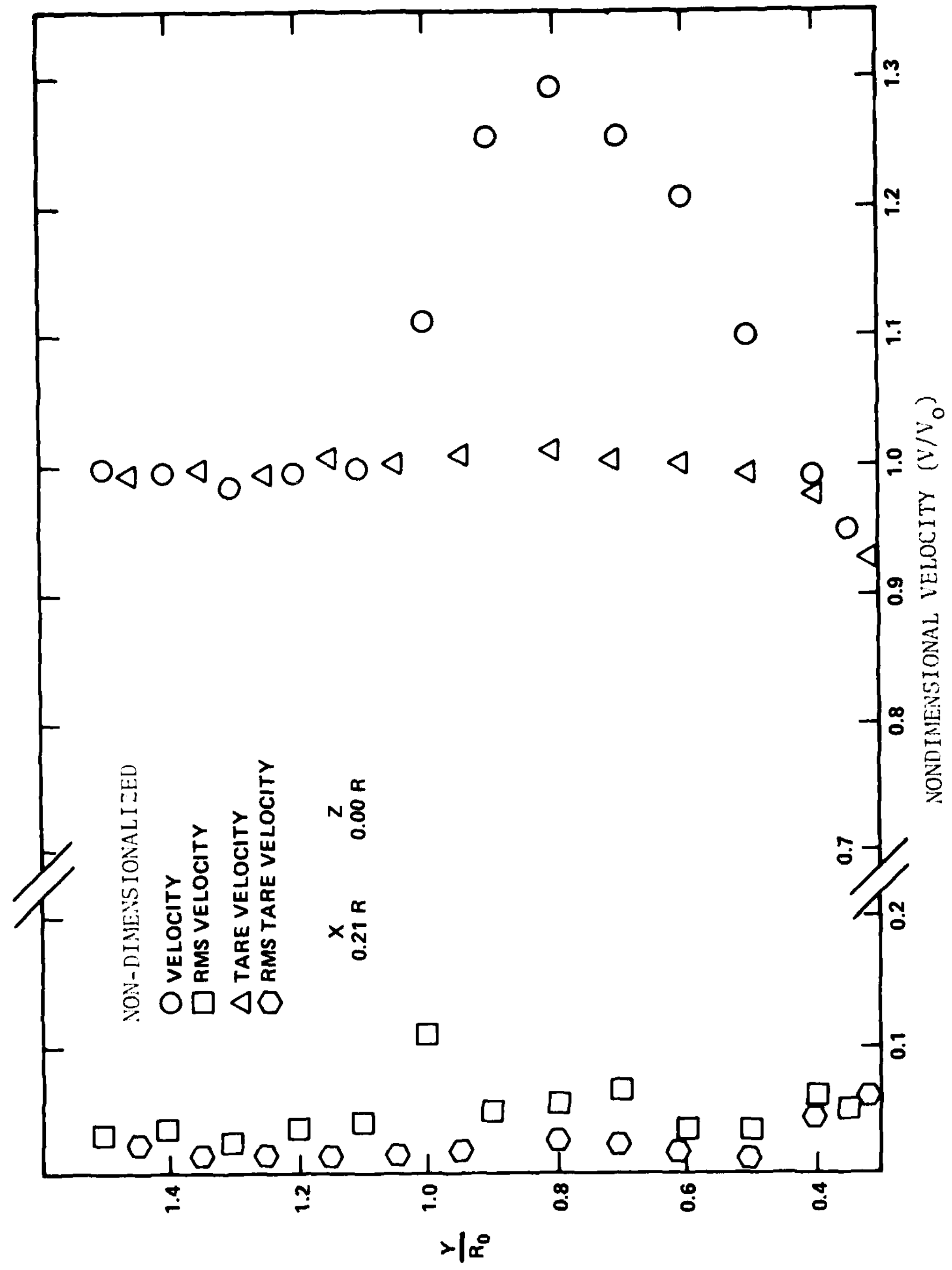


Figure 30 - Time Averaged Longitudinal Velocity and Rms Velocity Data at Shaft Inclination of 20 Degrees

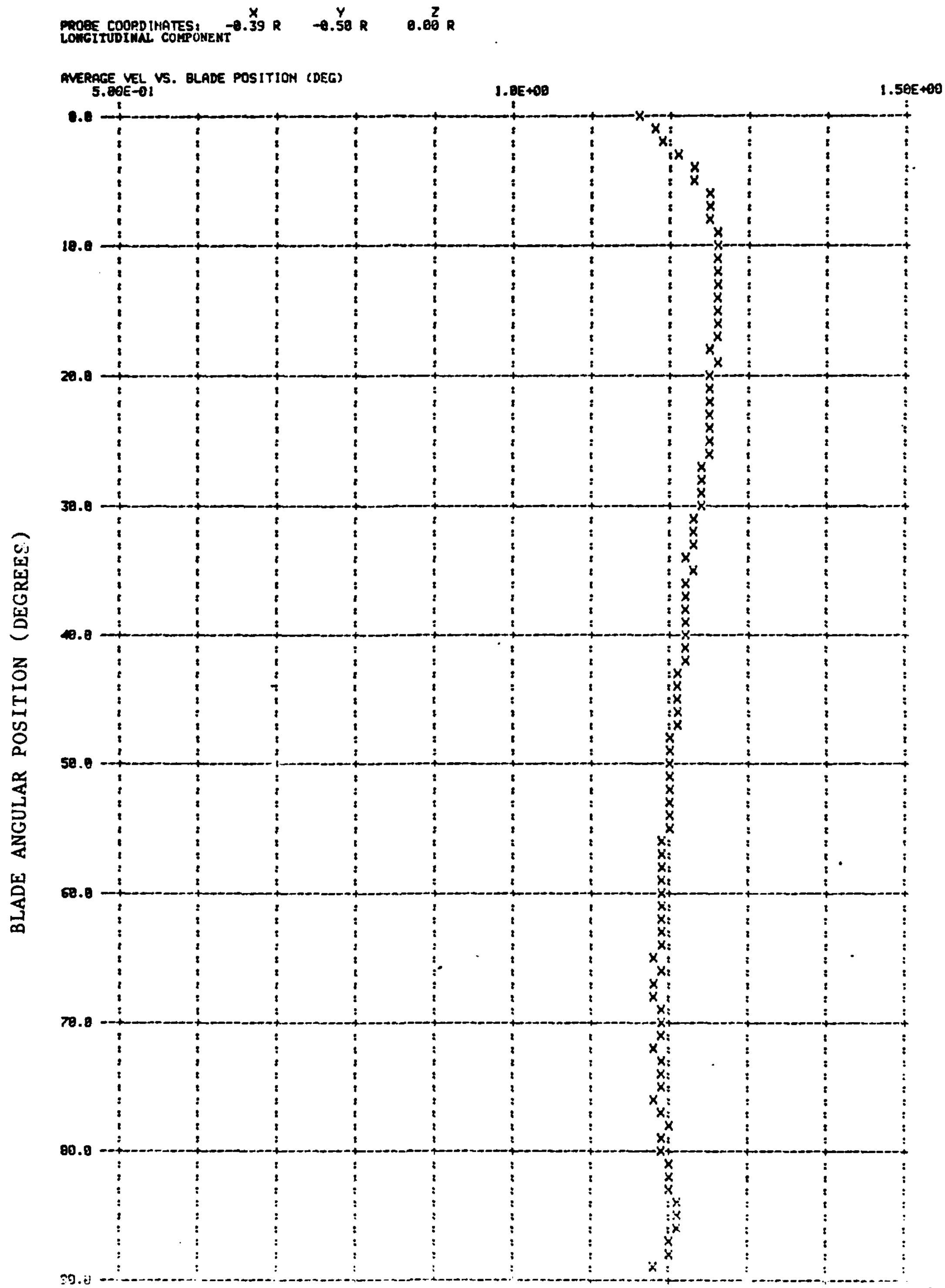


Figure 31a- Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

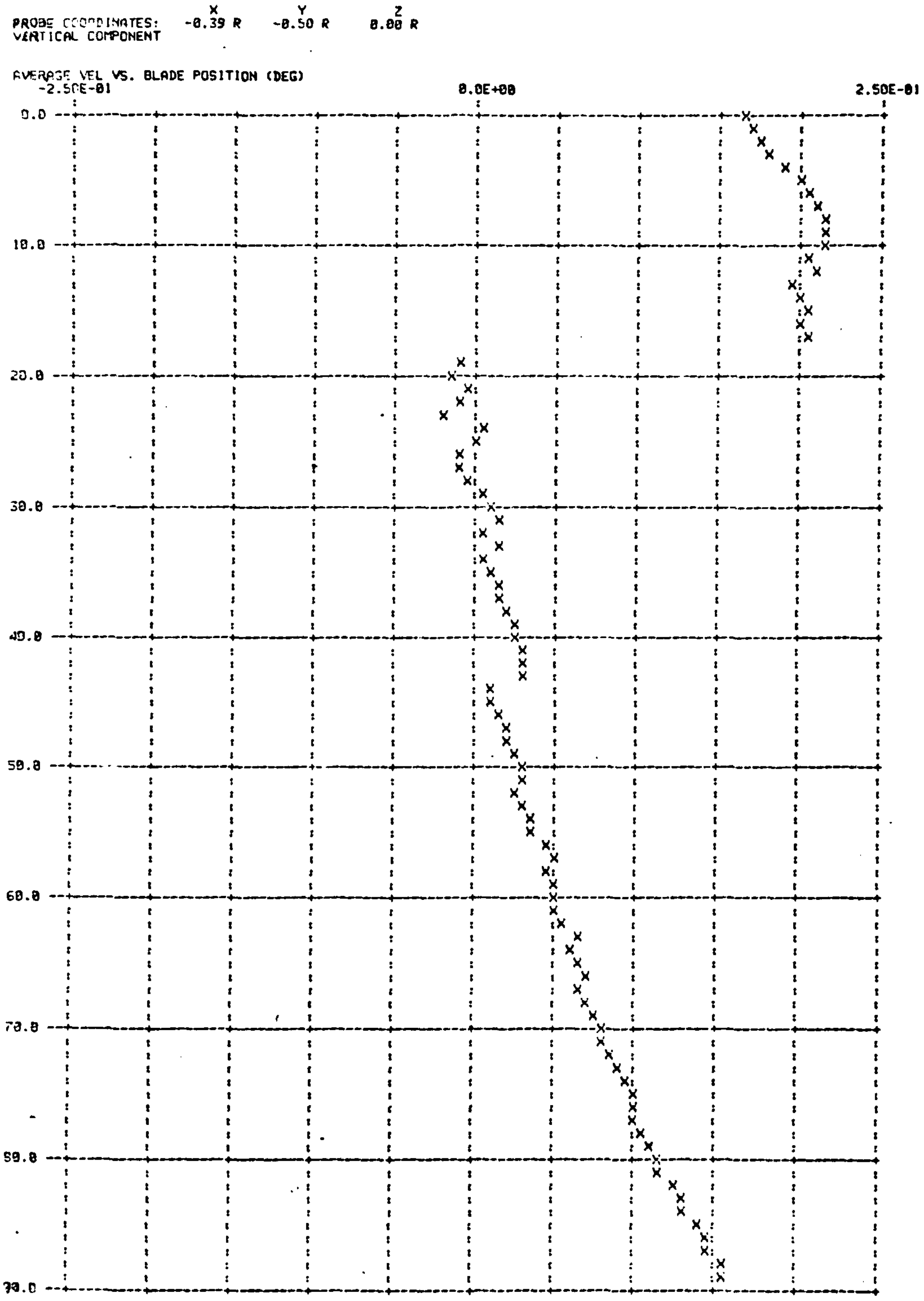


Figure 31b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

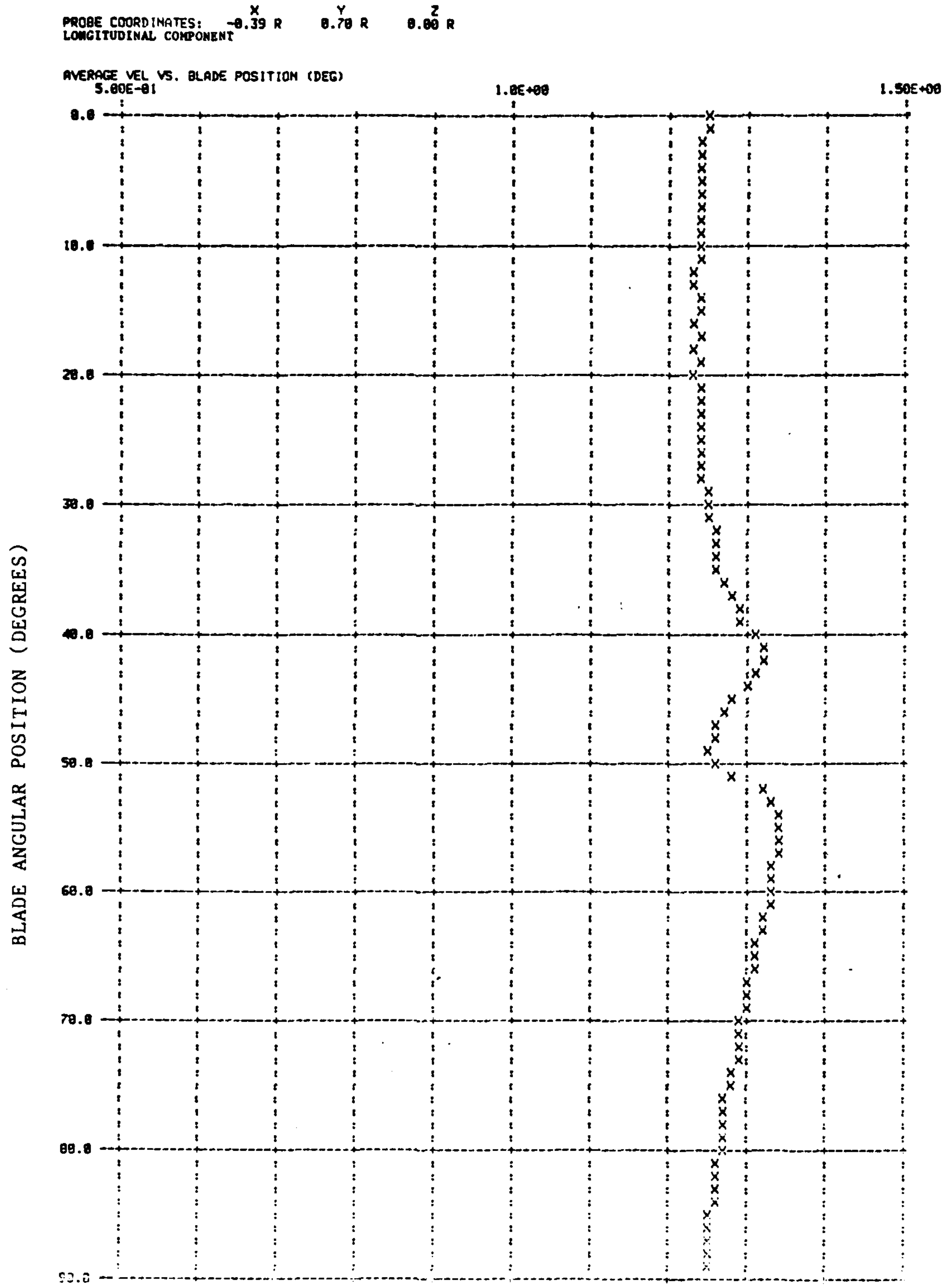


Figure 32a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

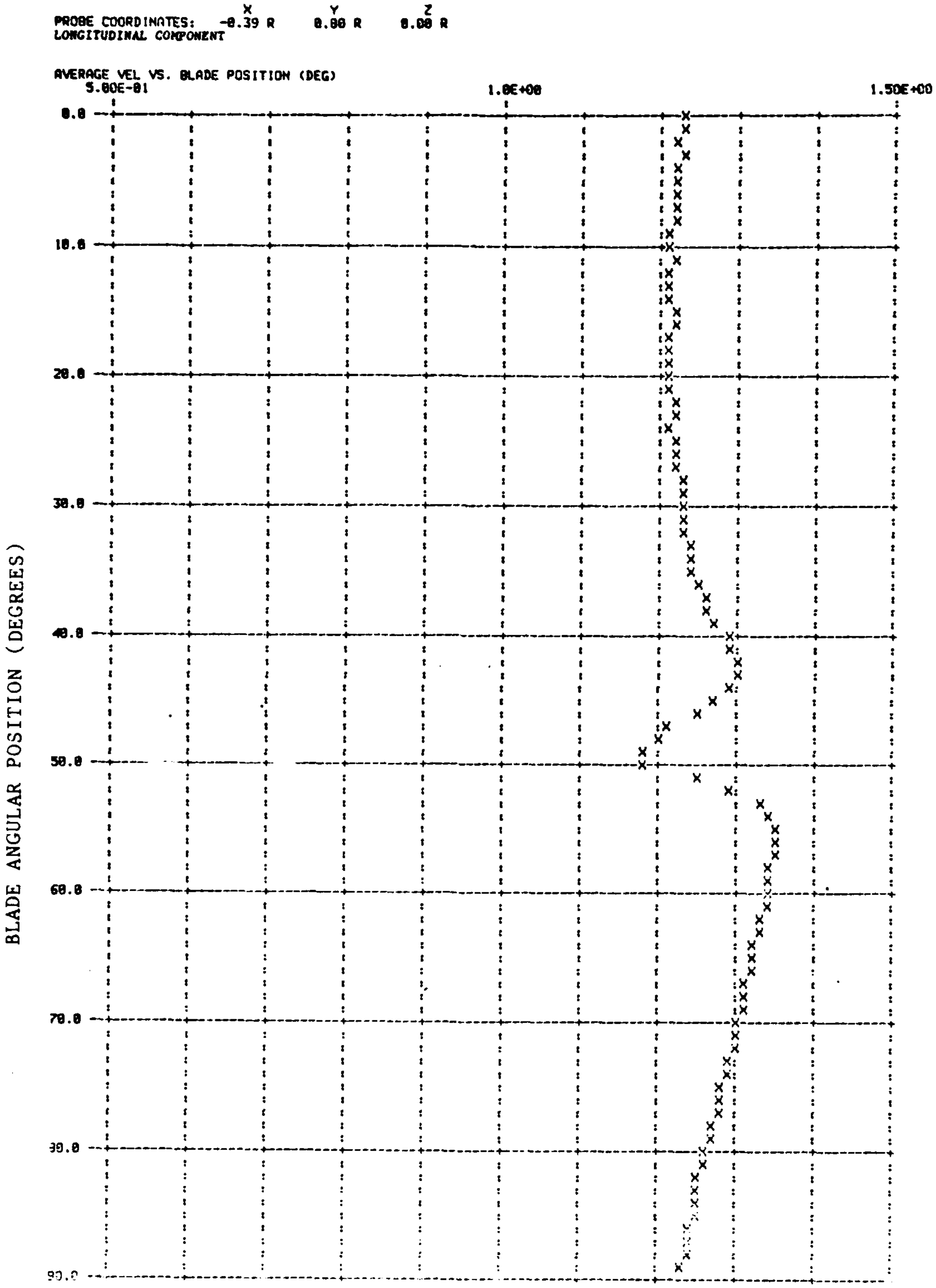


Figure 33a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

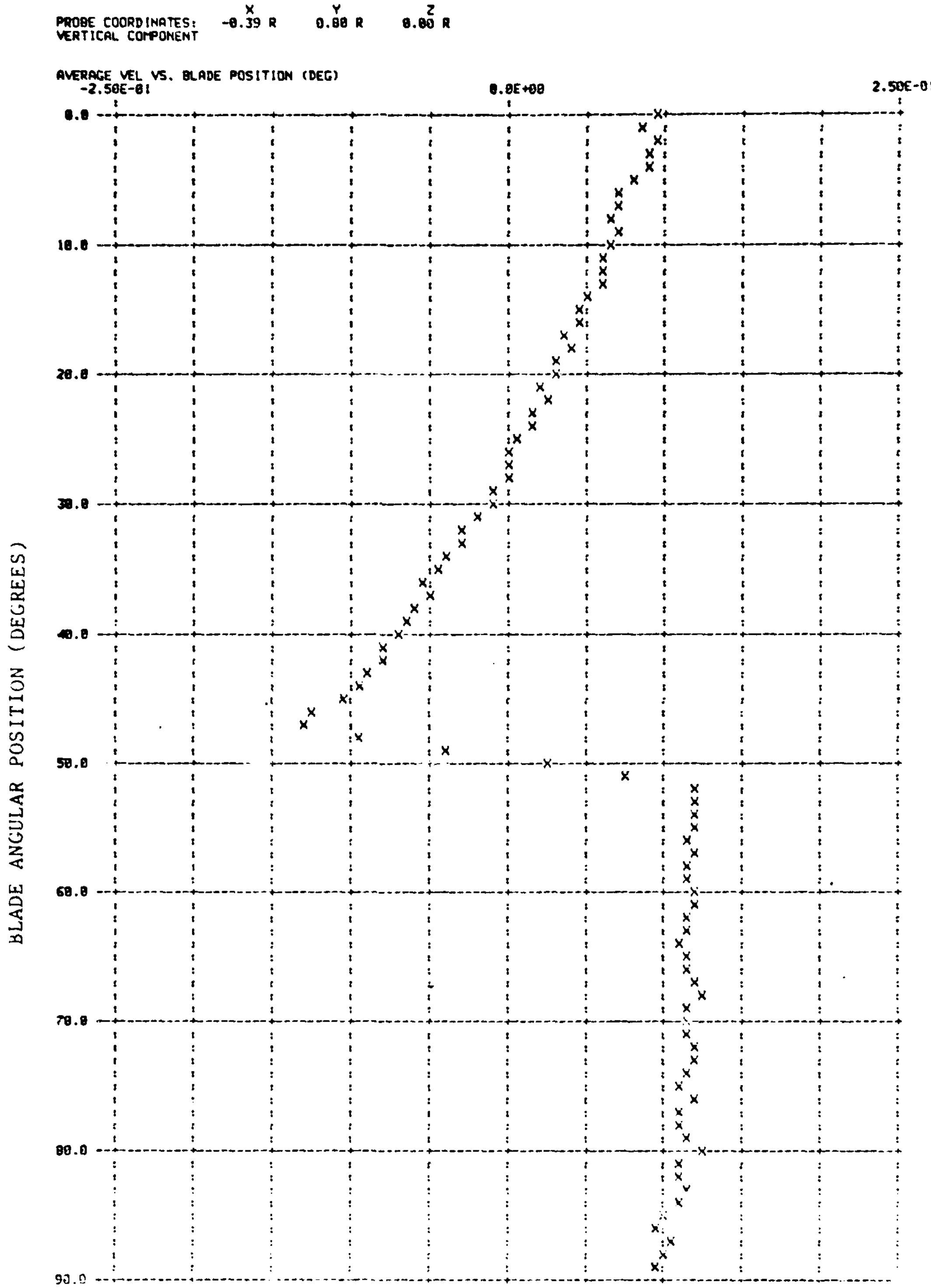


Figure 33b Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

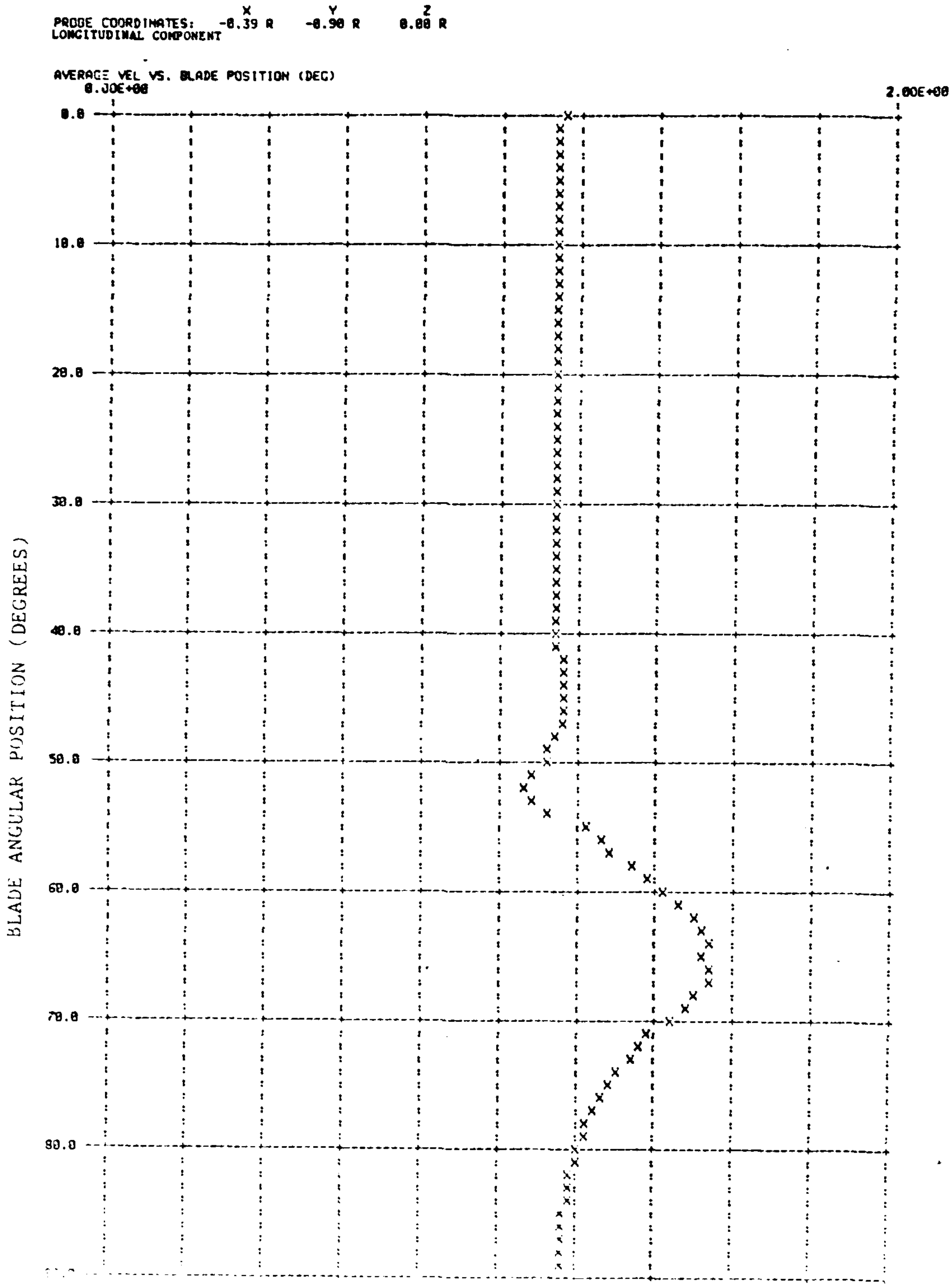


Figure 34a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

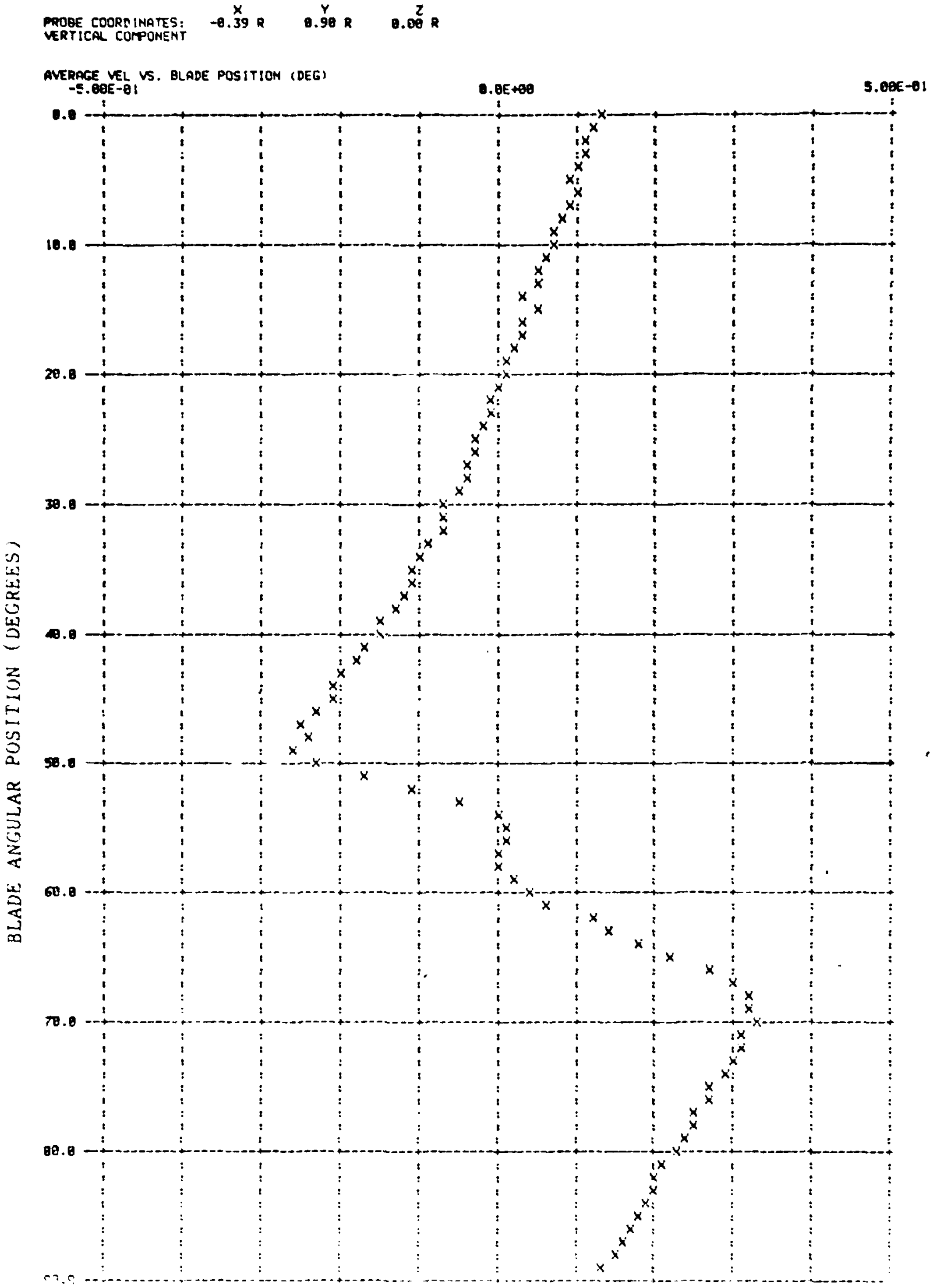


Figure 34b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

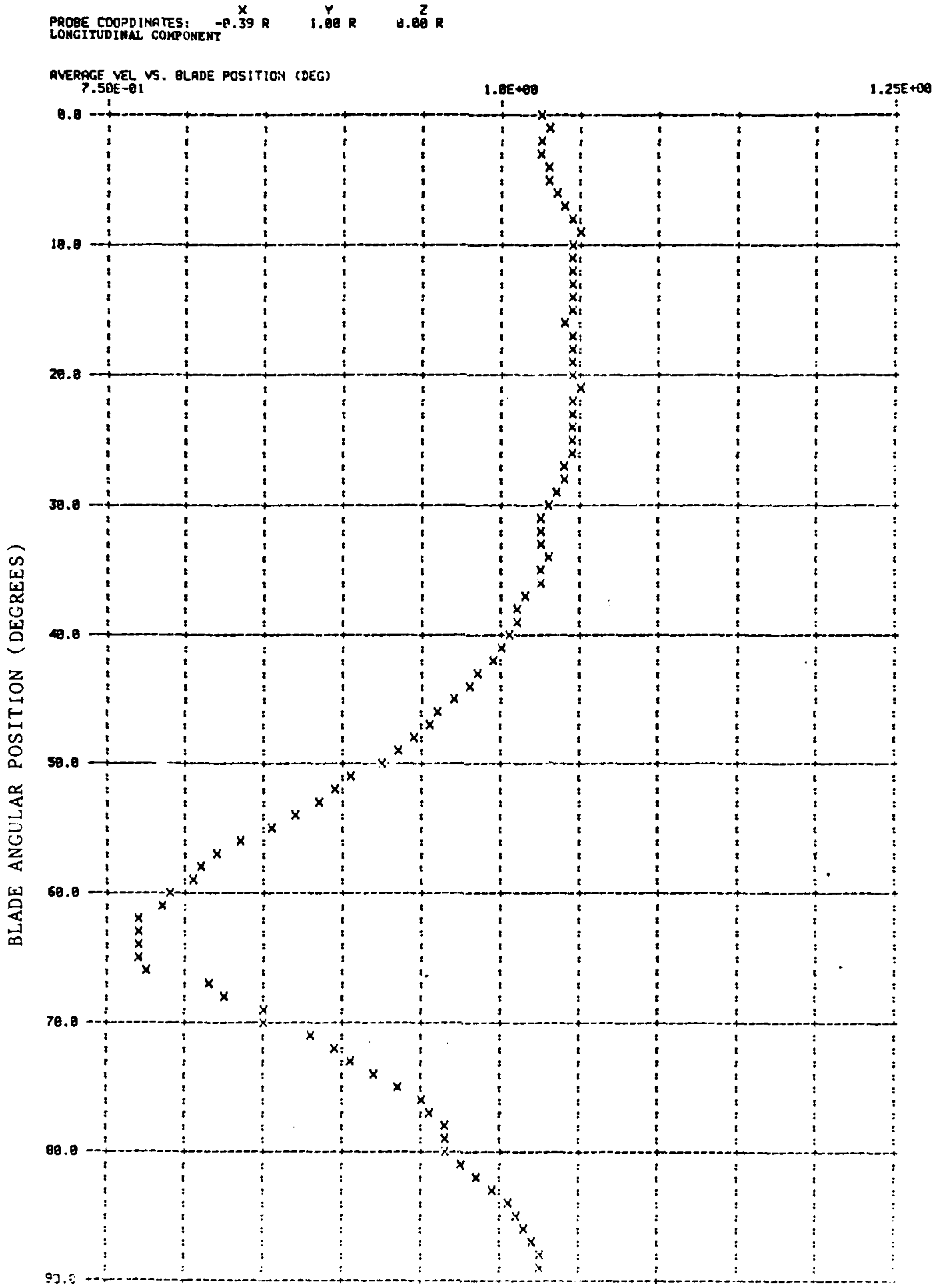


Figure 35a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

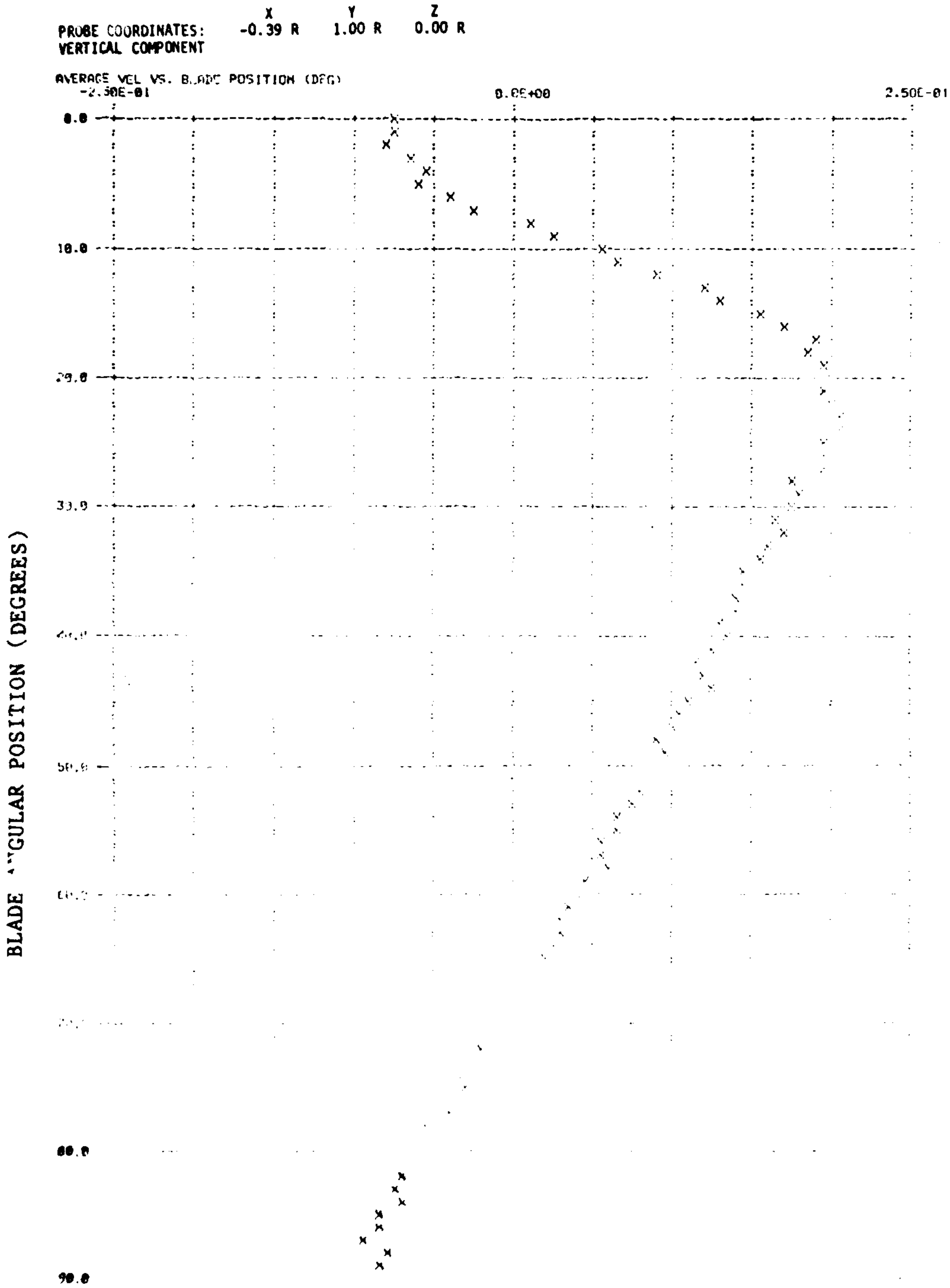


Figure 35b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

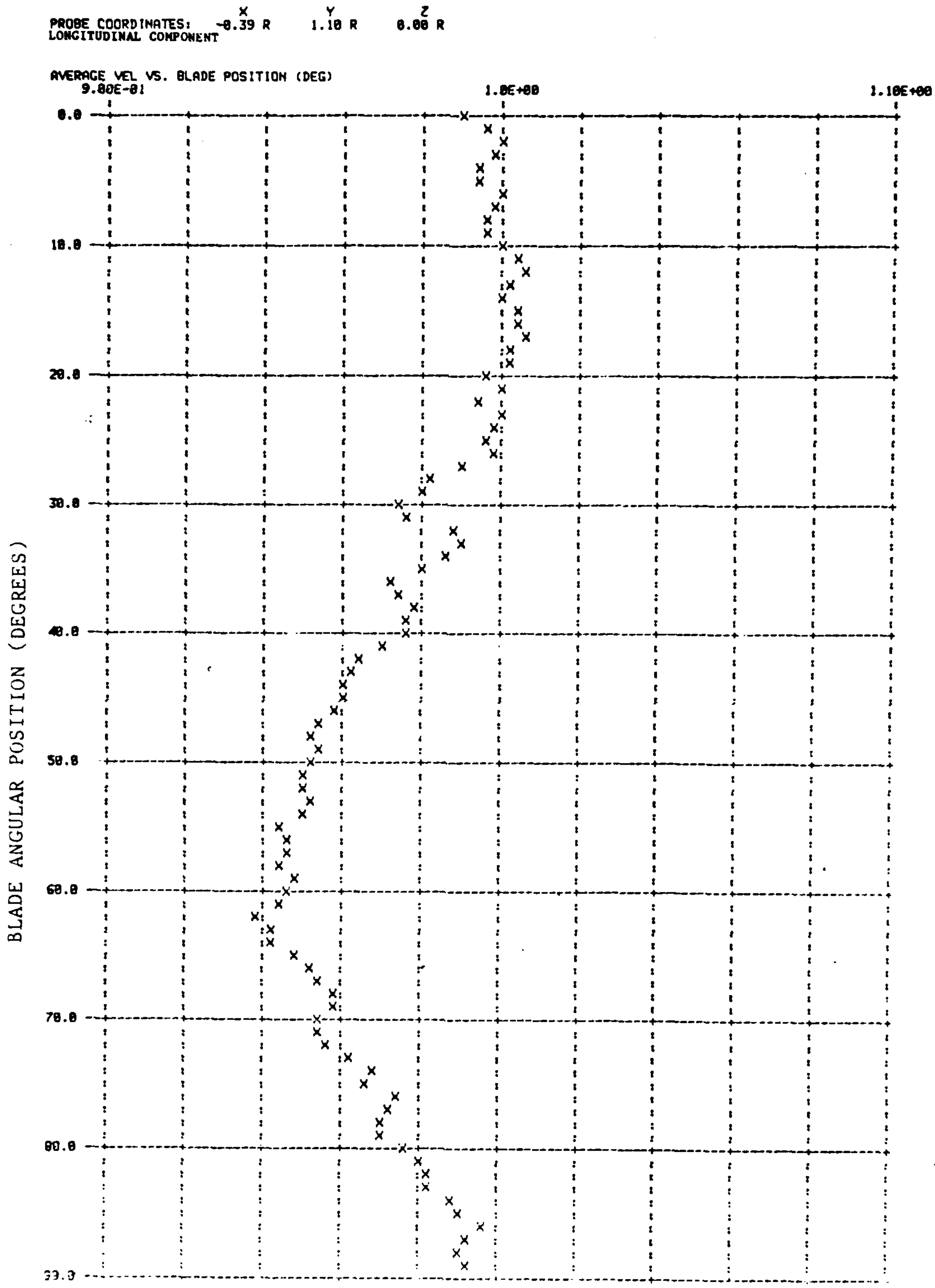


Figure 36a - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

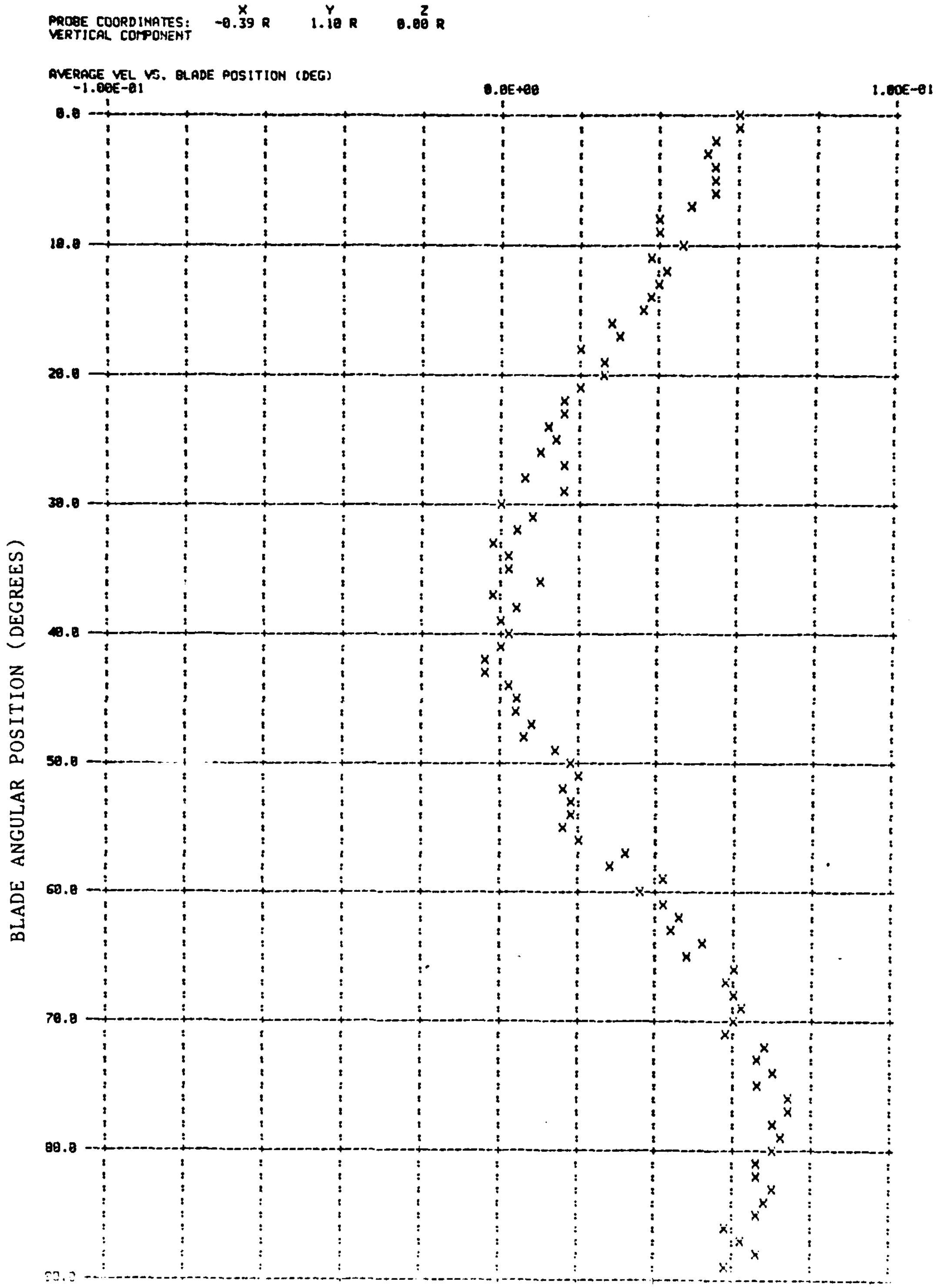


Figure 36b - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

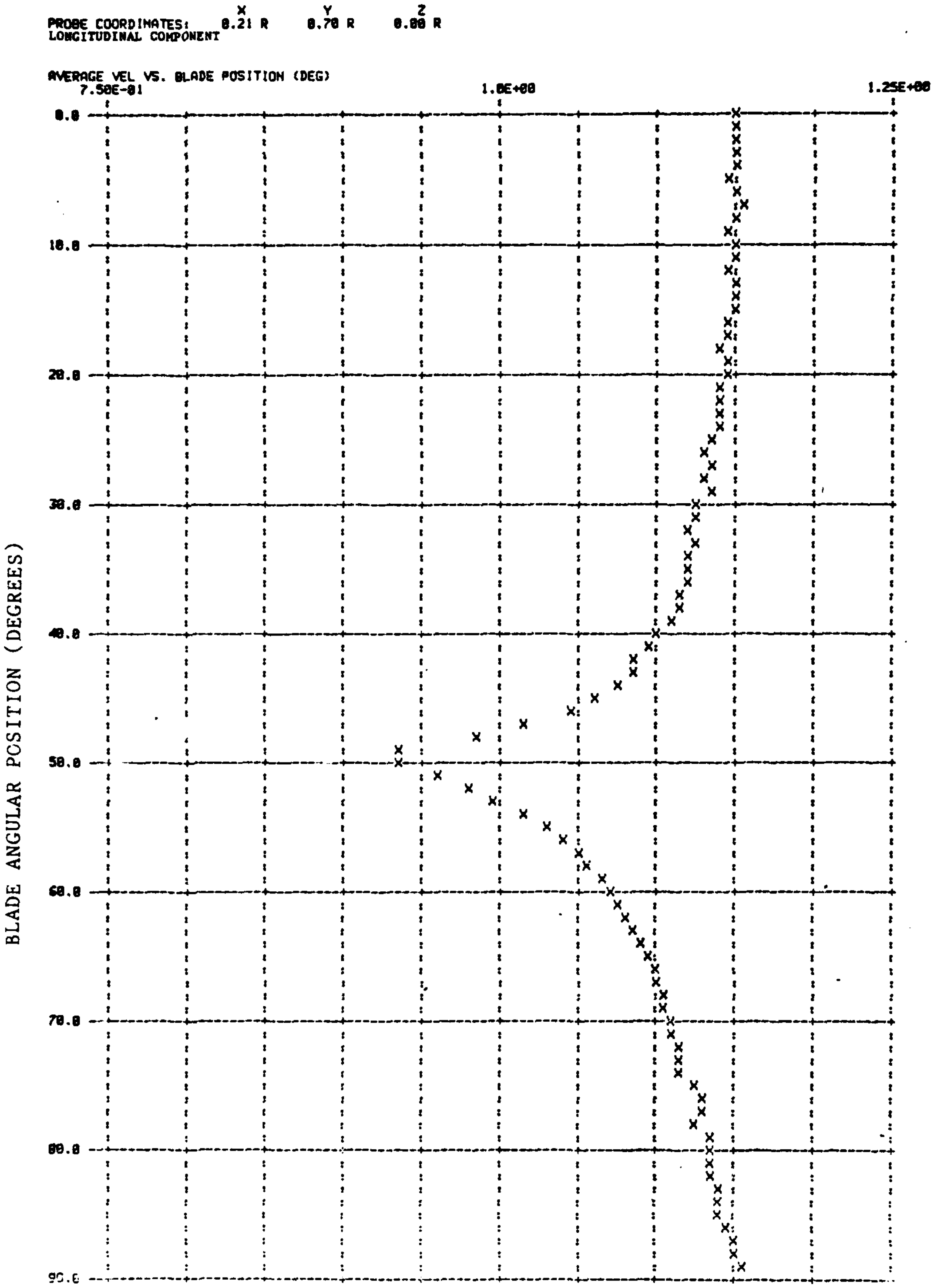


Figure 37a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

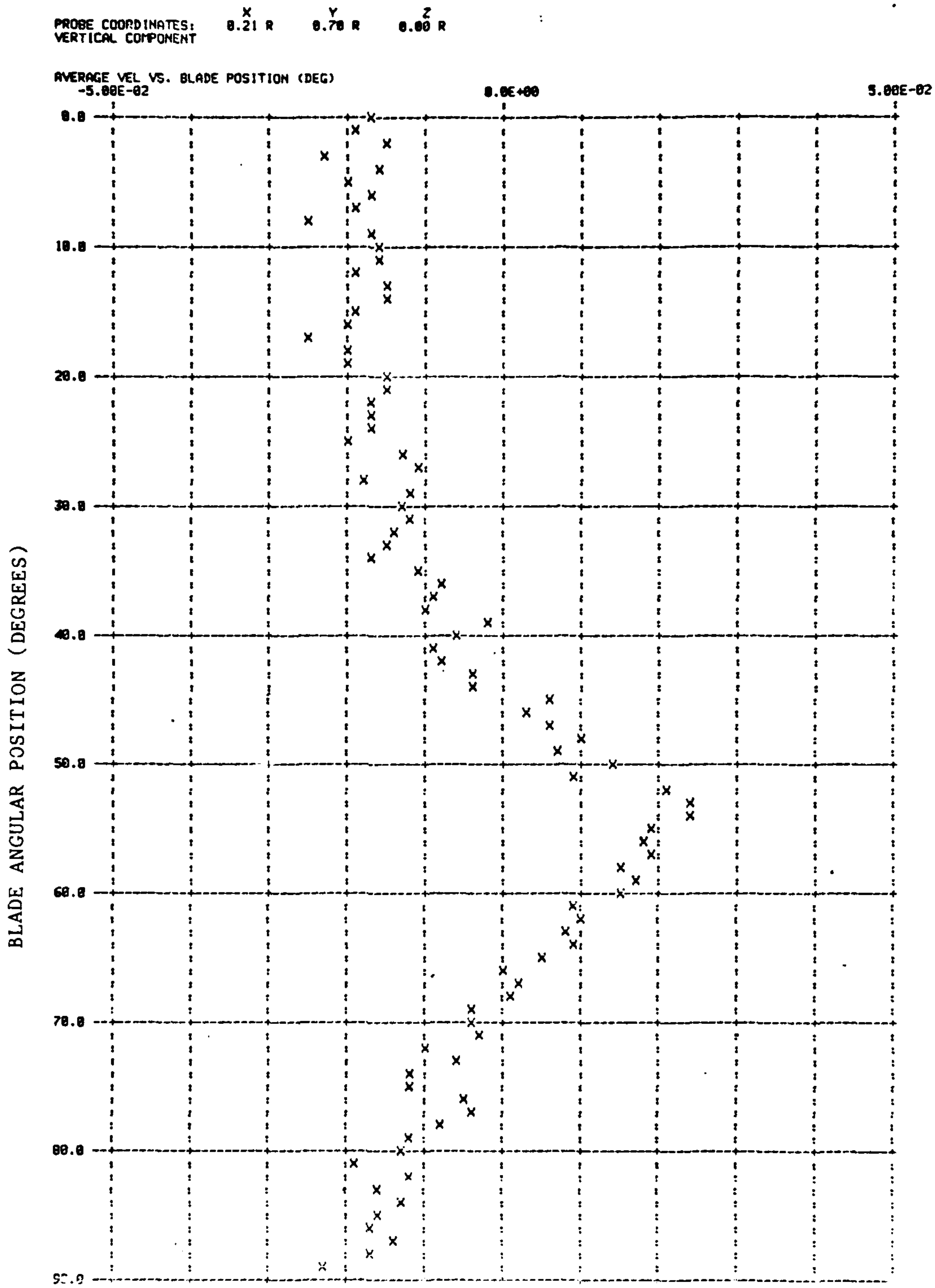


Figure 37b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

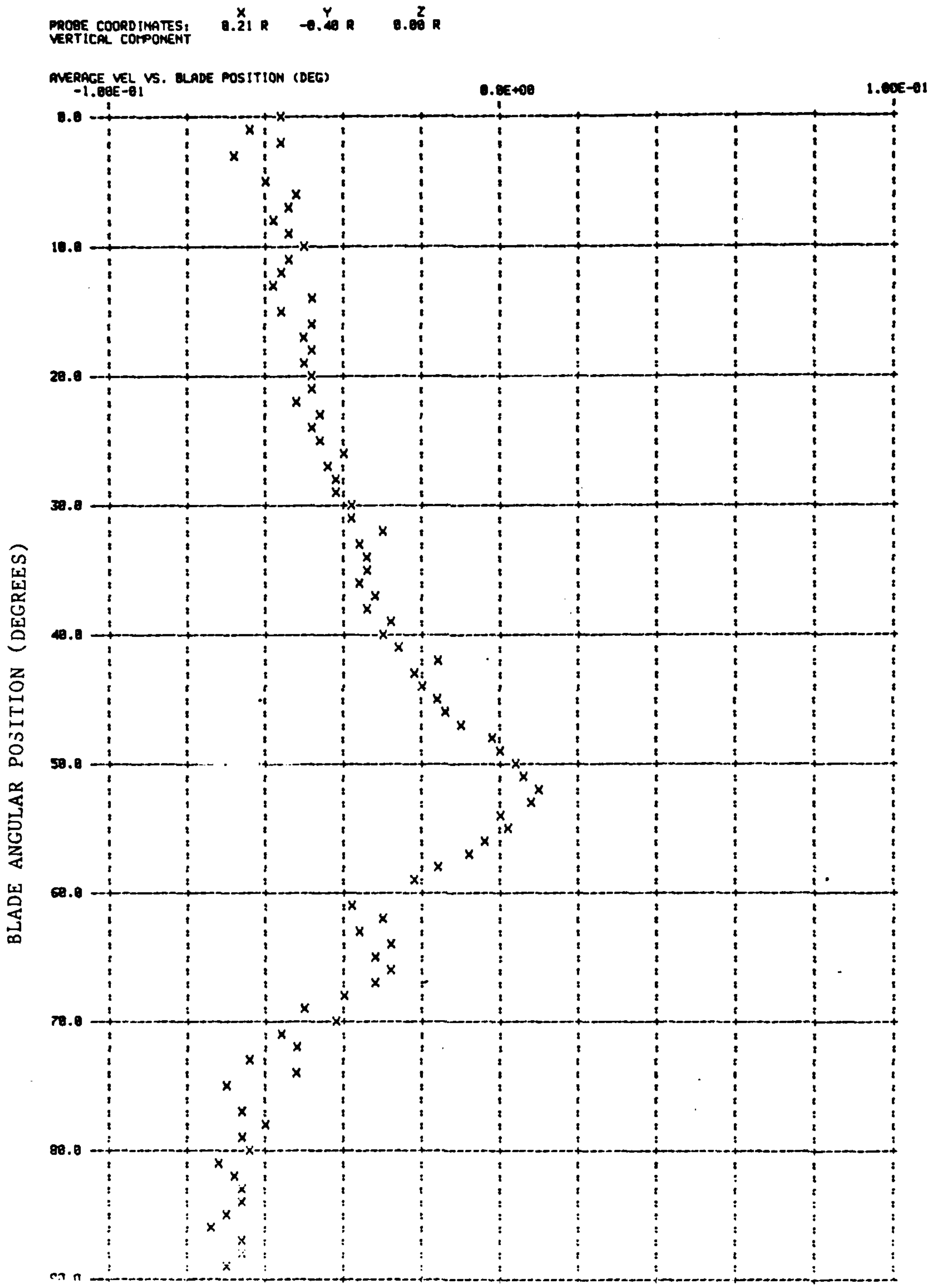


Figure 38b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

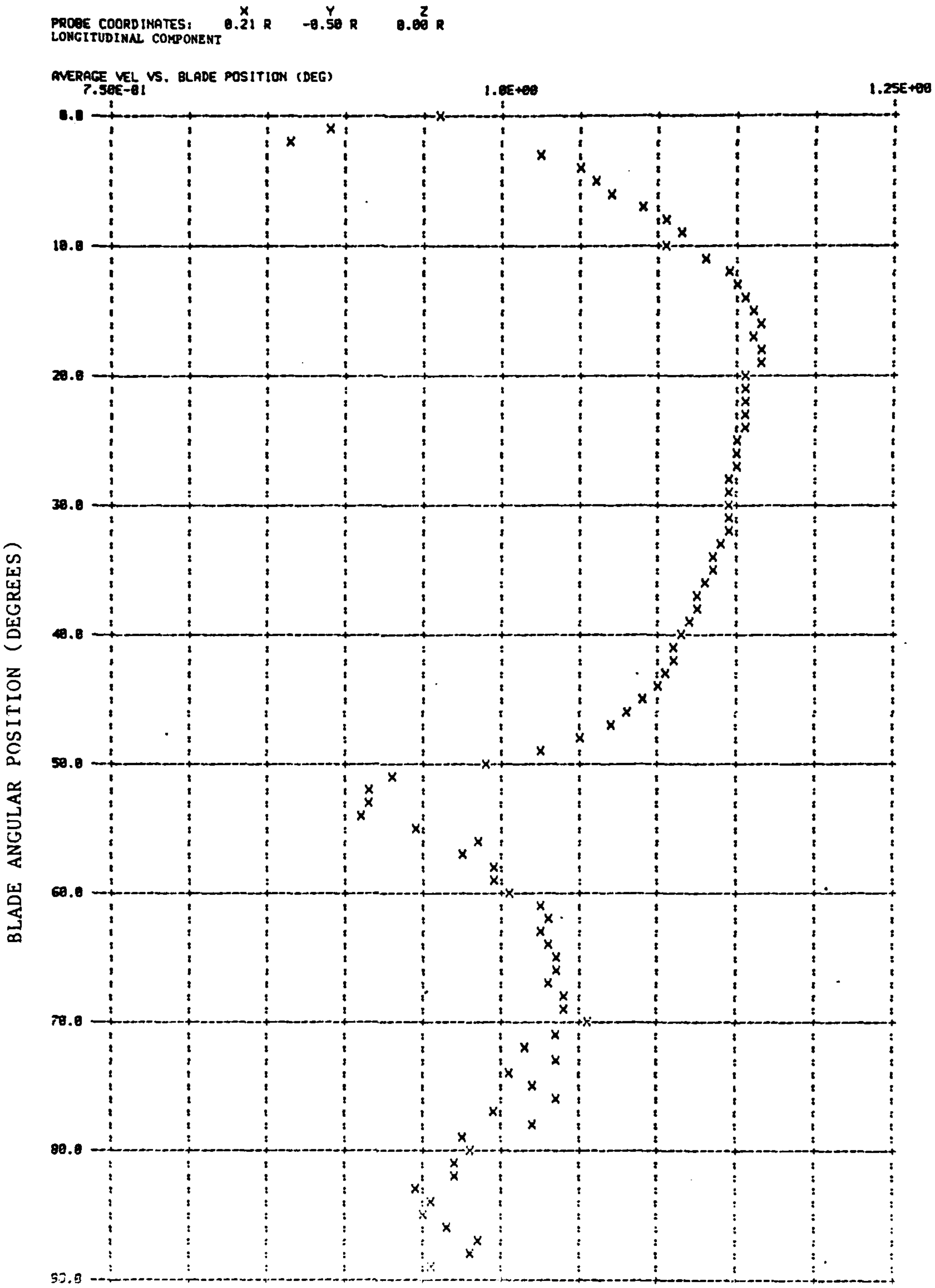


Figure 39a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

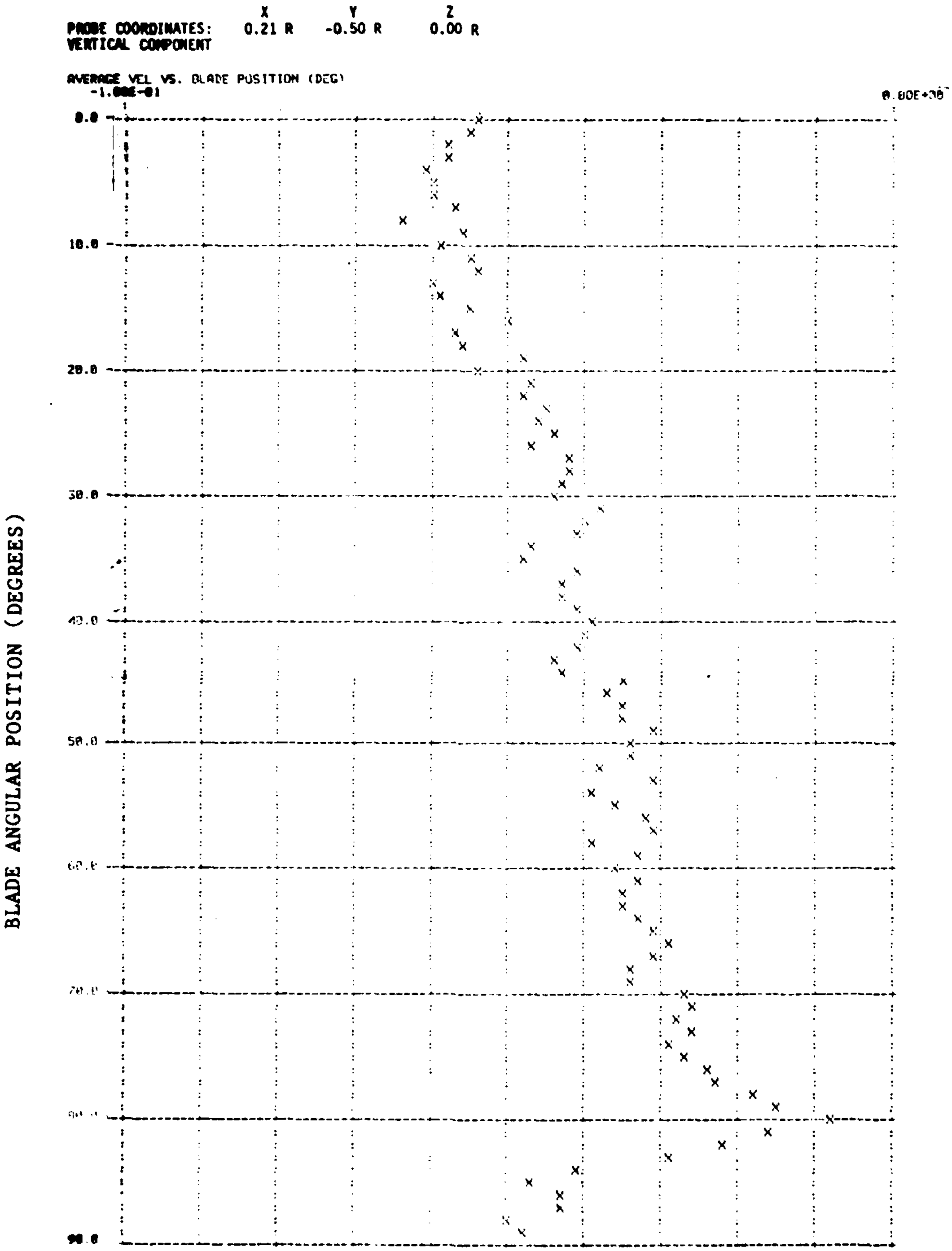


Figure 39b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

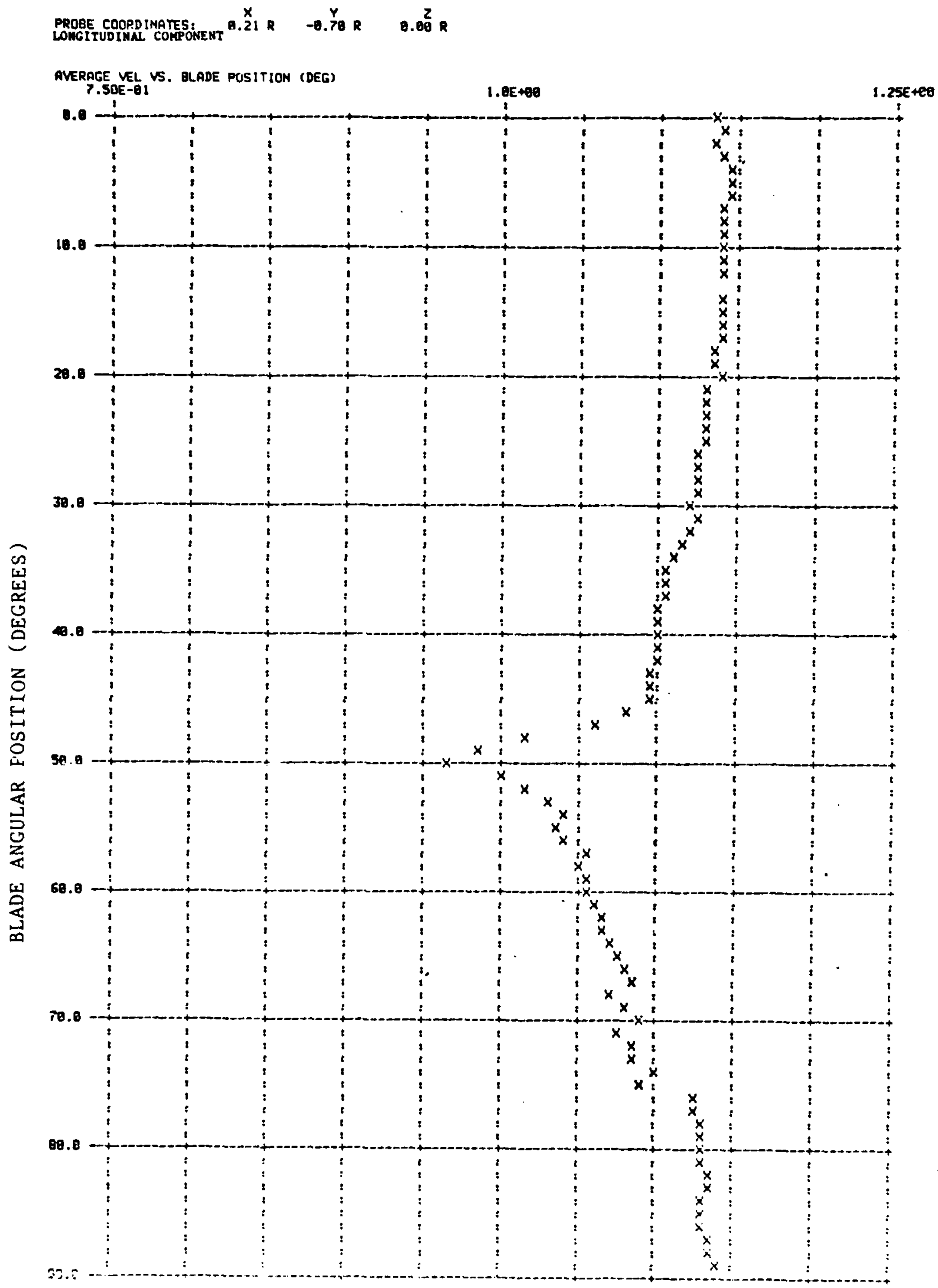


Figure 40a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

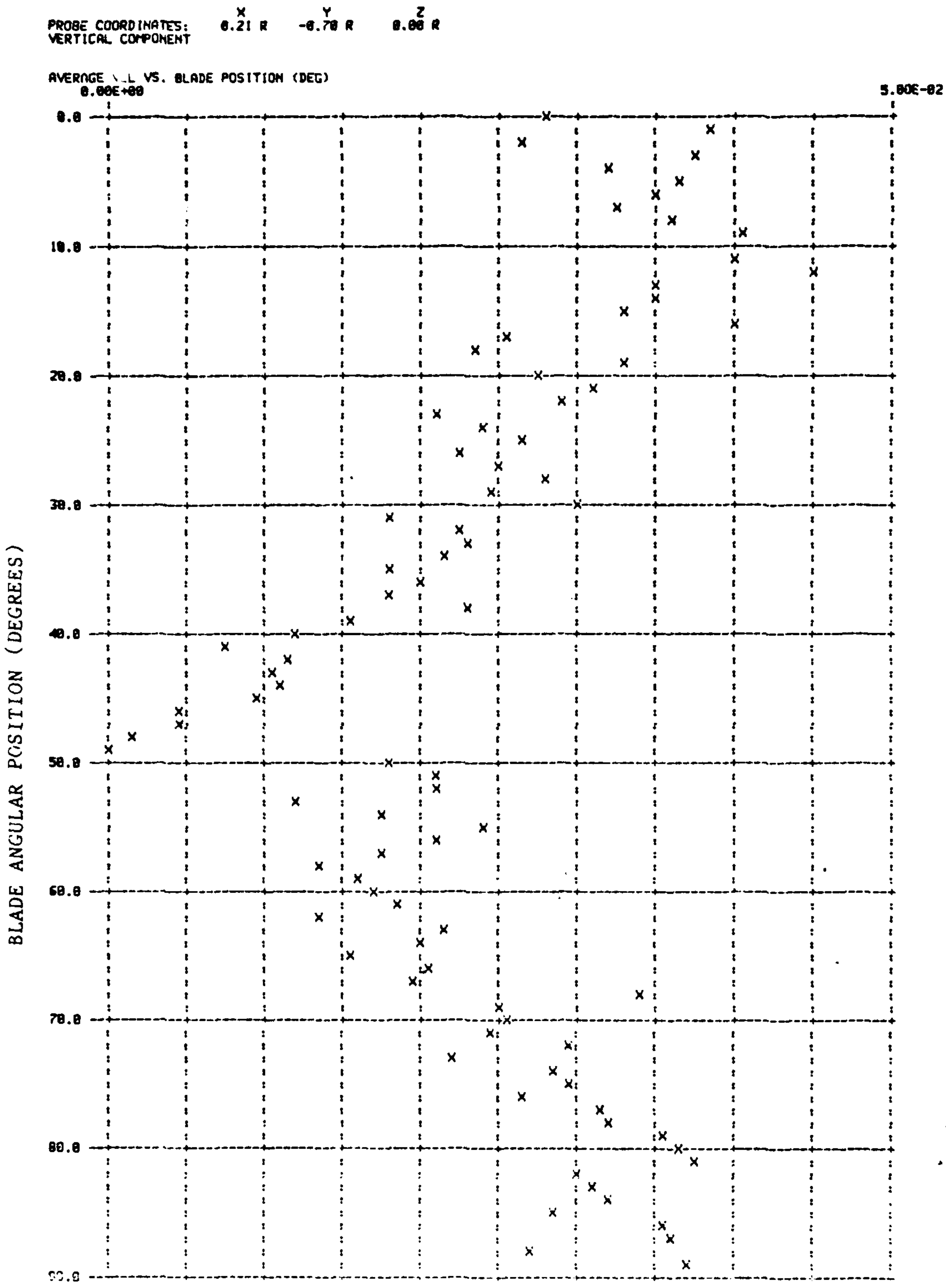


Figure 40b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X 0.21 R Y -0.00 R Z 0.00 R
LONGITUDINAL COMPONENT

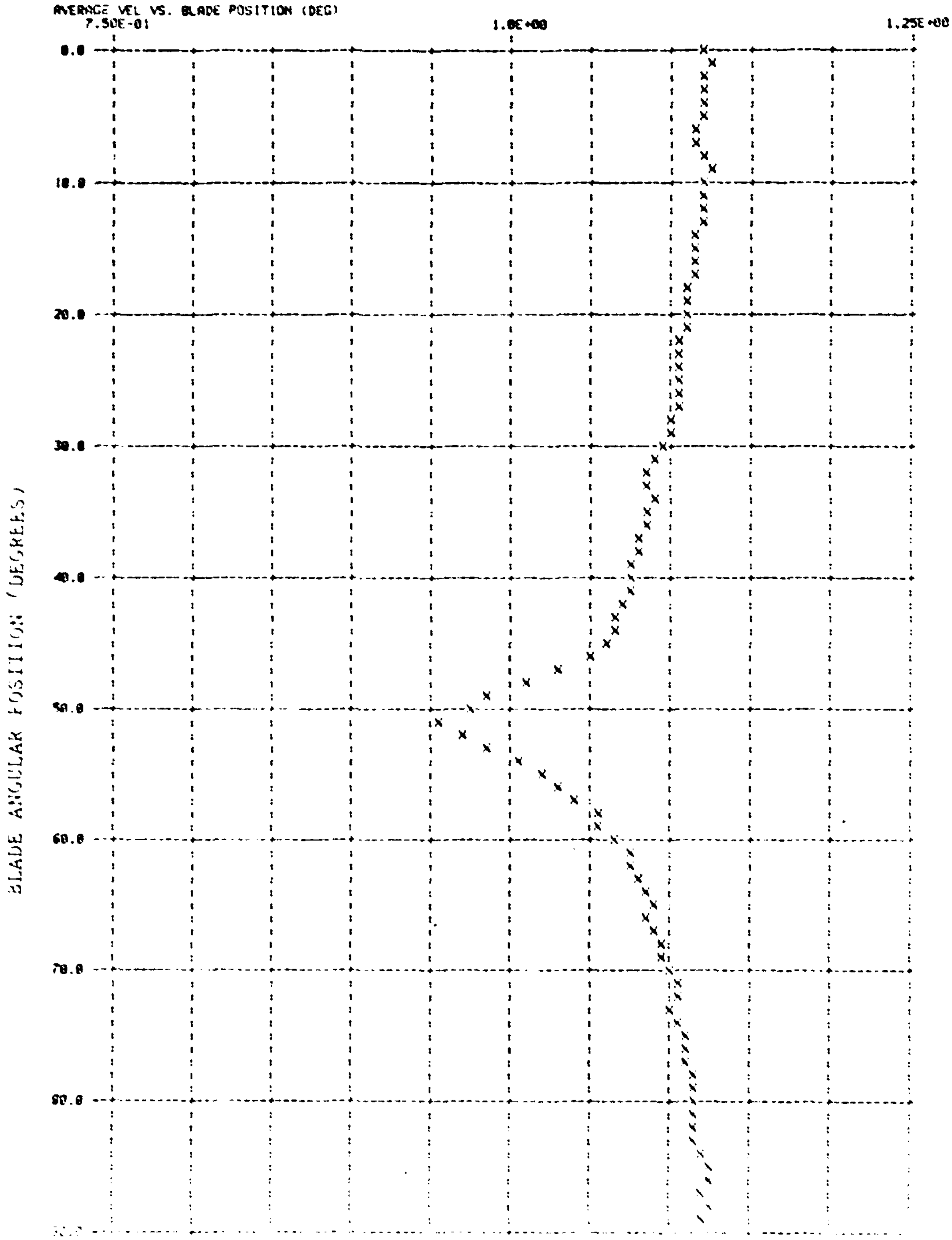


Figure 41a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

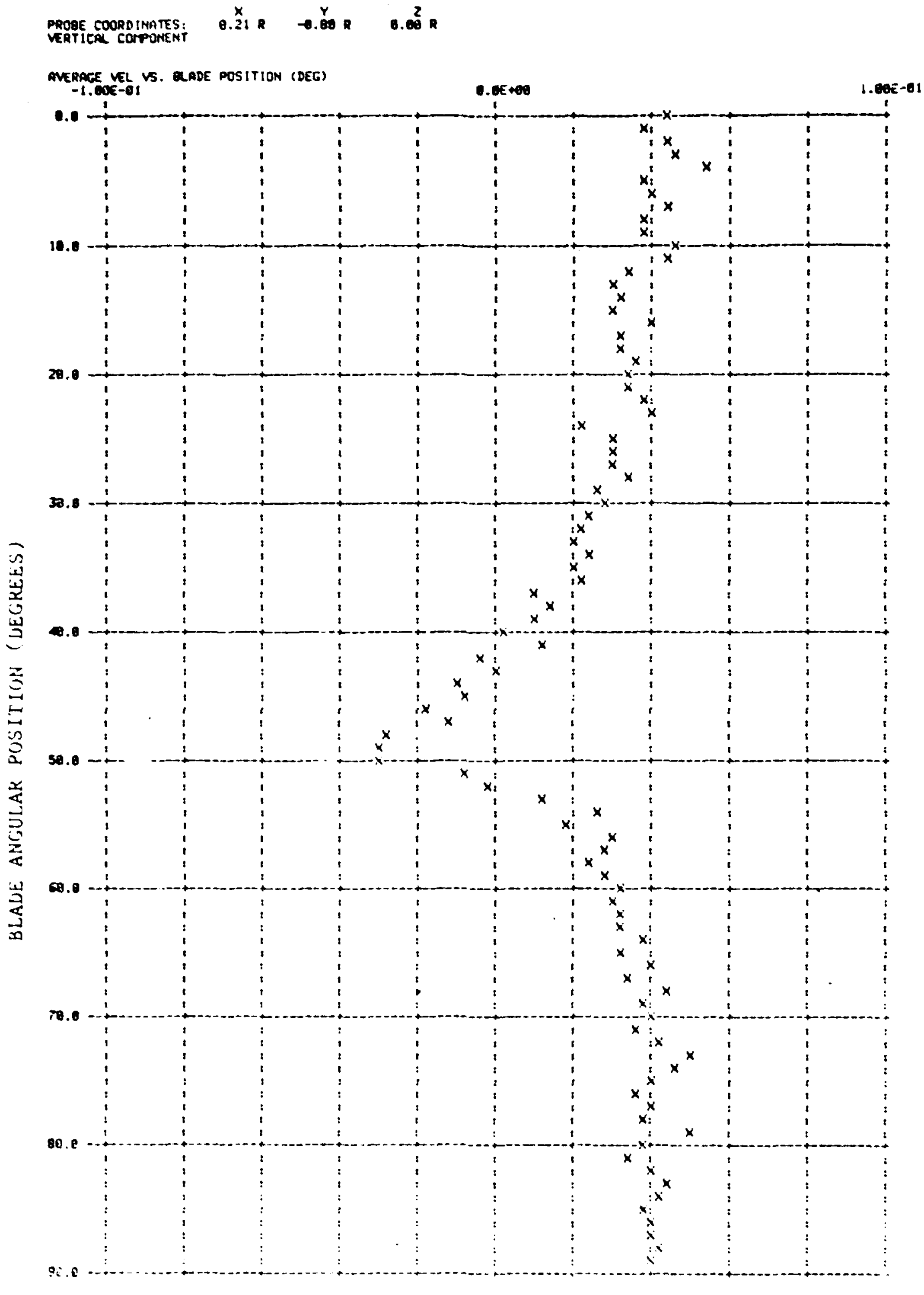


Figure 41b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

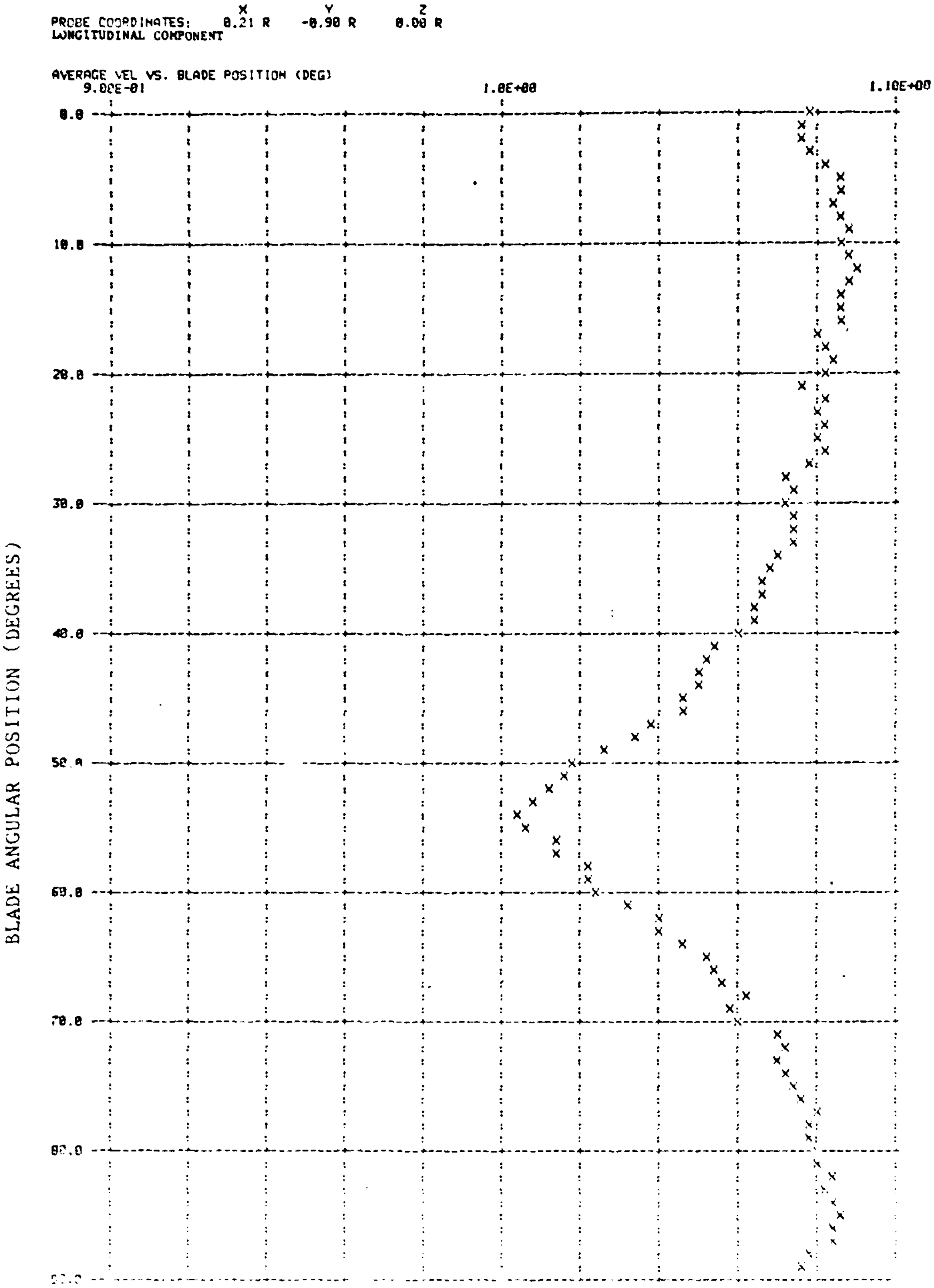


Figure 42a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

AD-A088 937 DAVID W TAYLOR NAVAL SHIP RESEARCH AND DEVELOPMENT CE--ETC F/G 13/10
EXPERIMENTAL DETERMINATION OF TWO COMPONENTS OF FIELD POINT VEL--ETC(U)
FEB 80 N SANTELLI, J LIBBY, M JEFFERS

UNCLASSIFIED DTNSRDC/SPD-0921-01 NL

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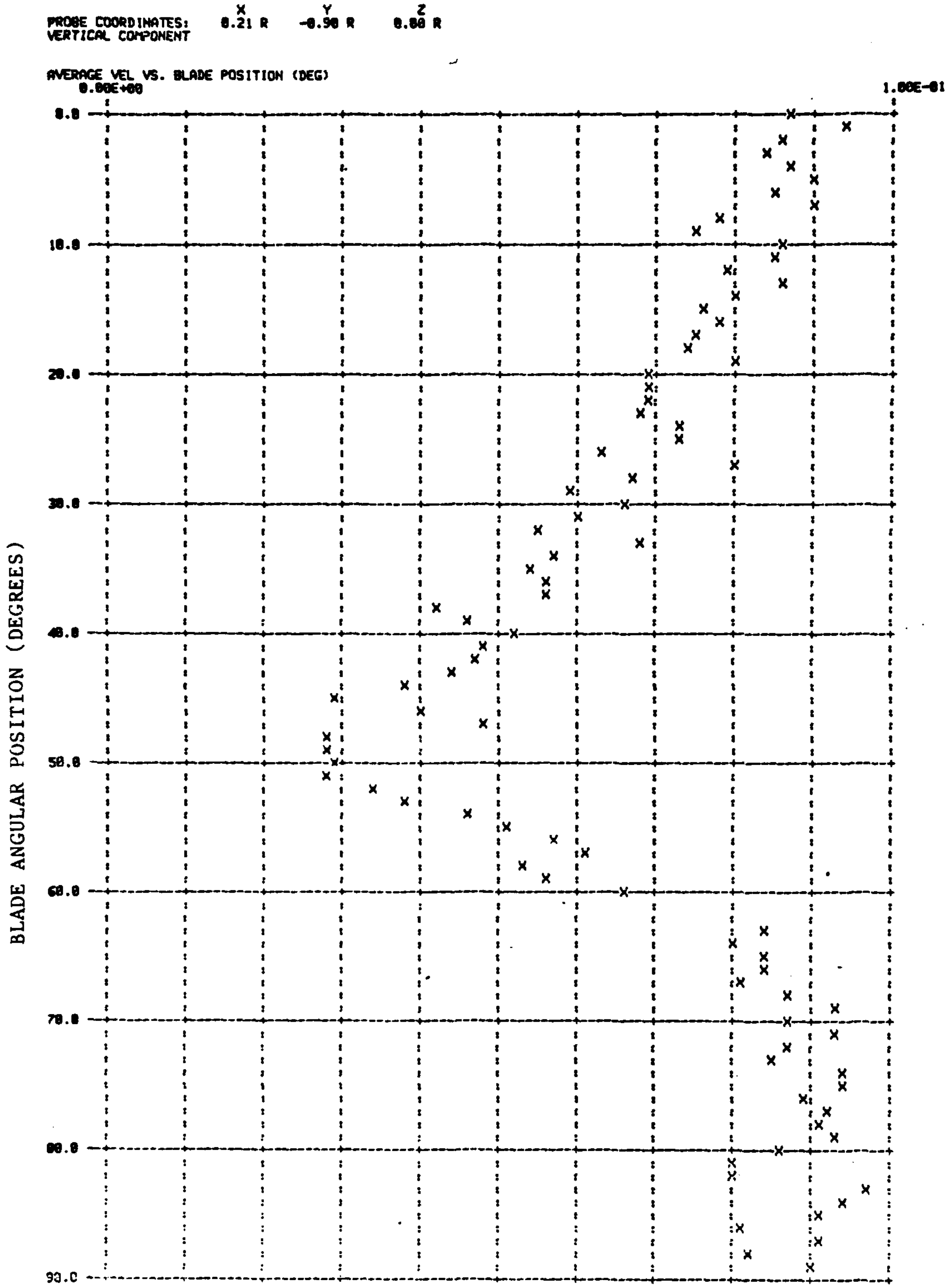

Figure 42b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

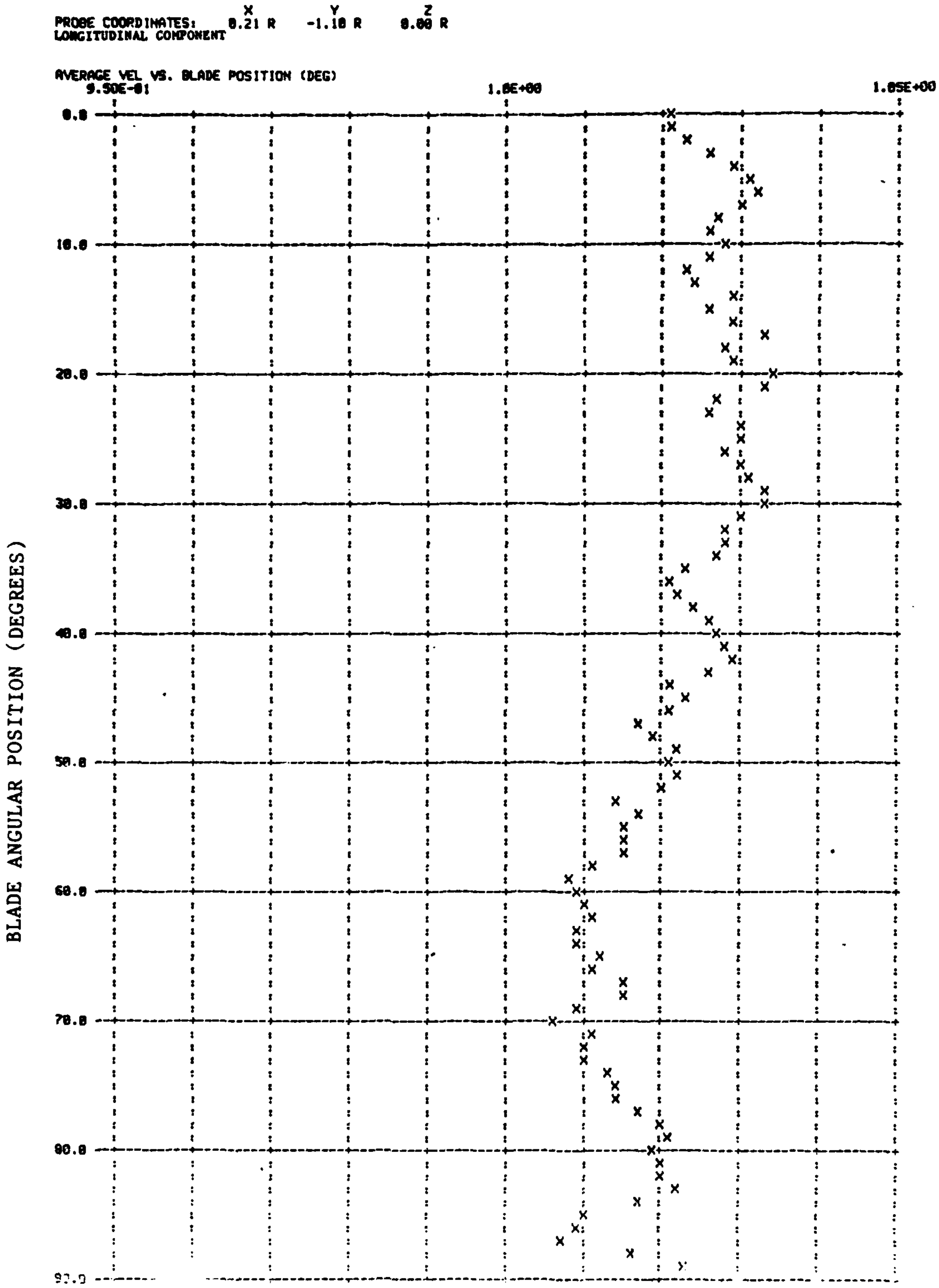

Figure 43a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

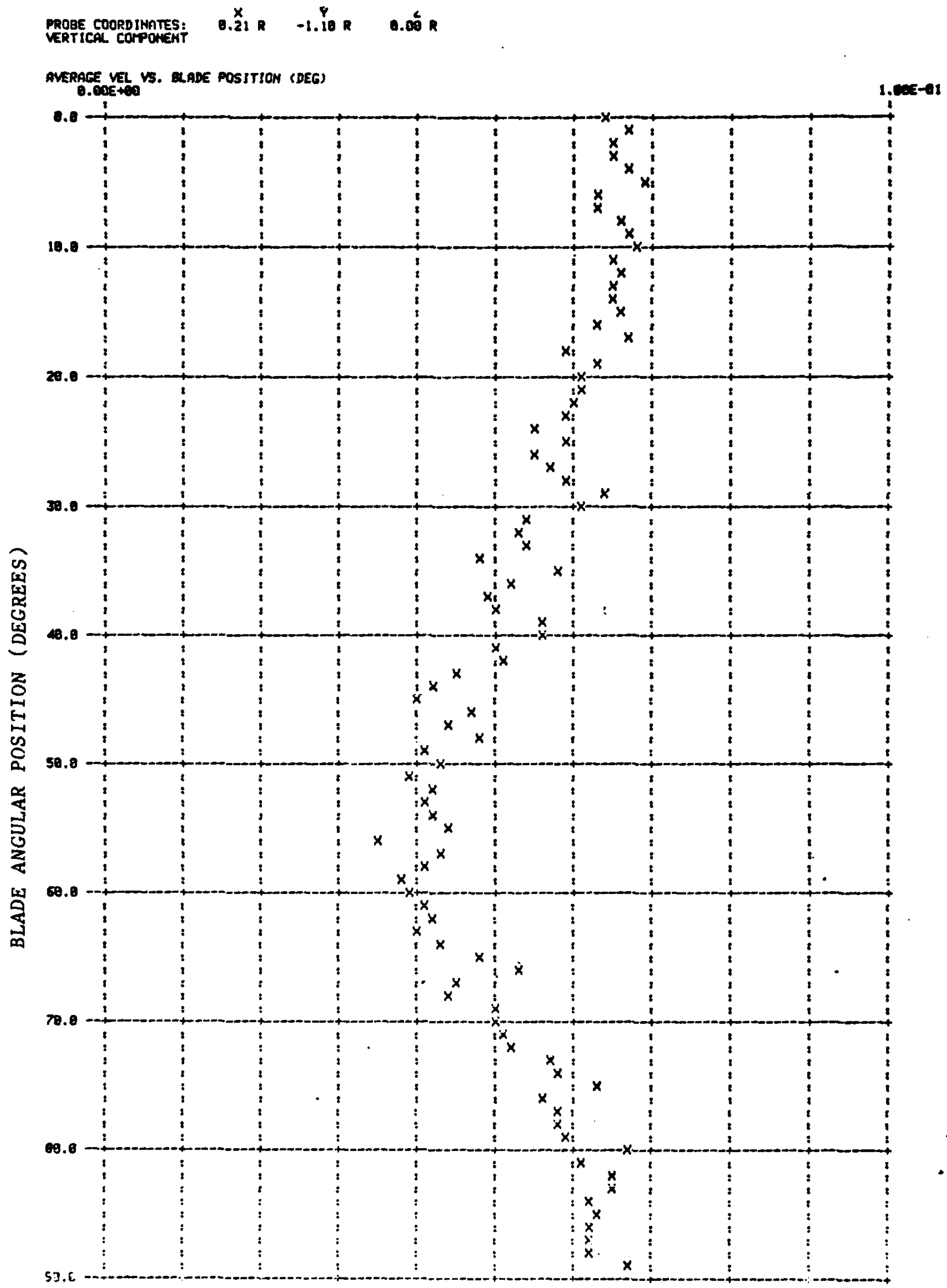

Figure 43b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

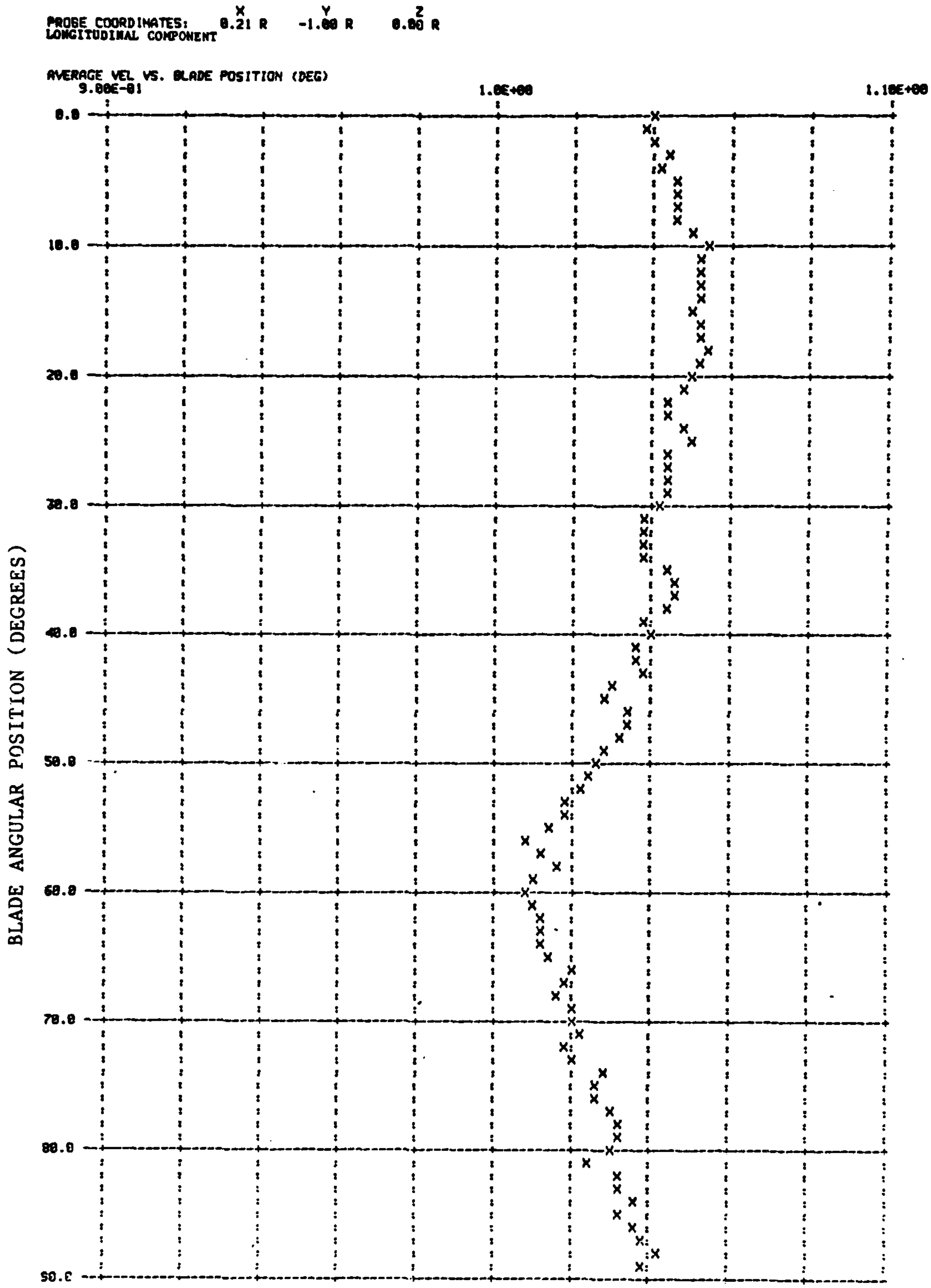

Figure 44a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

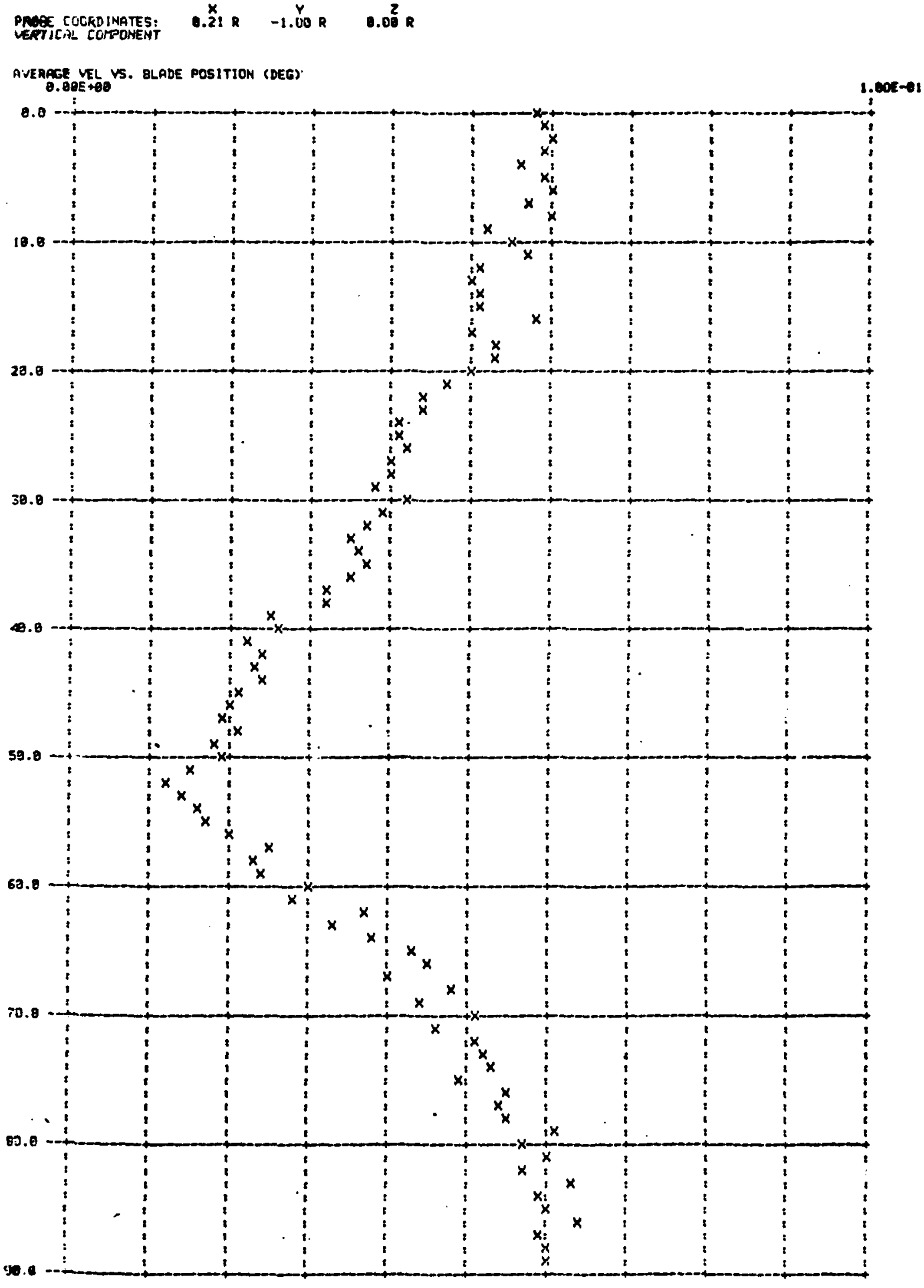

Figure 44b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

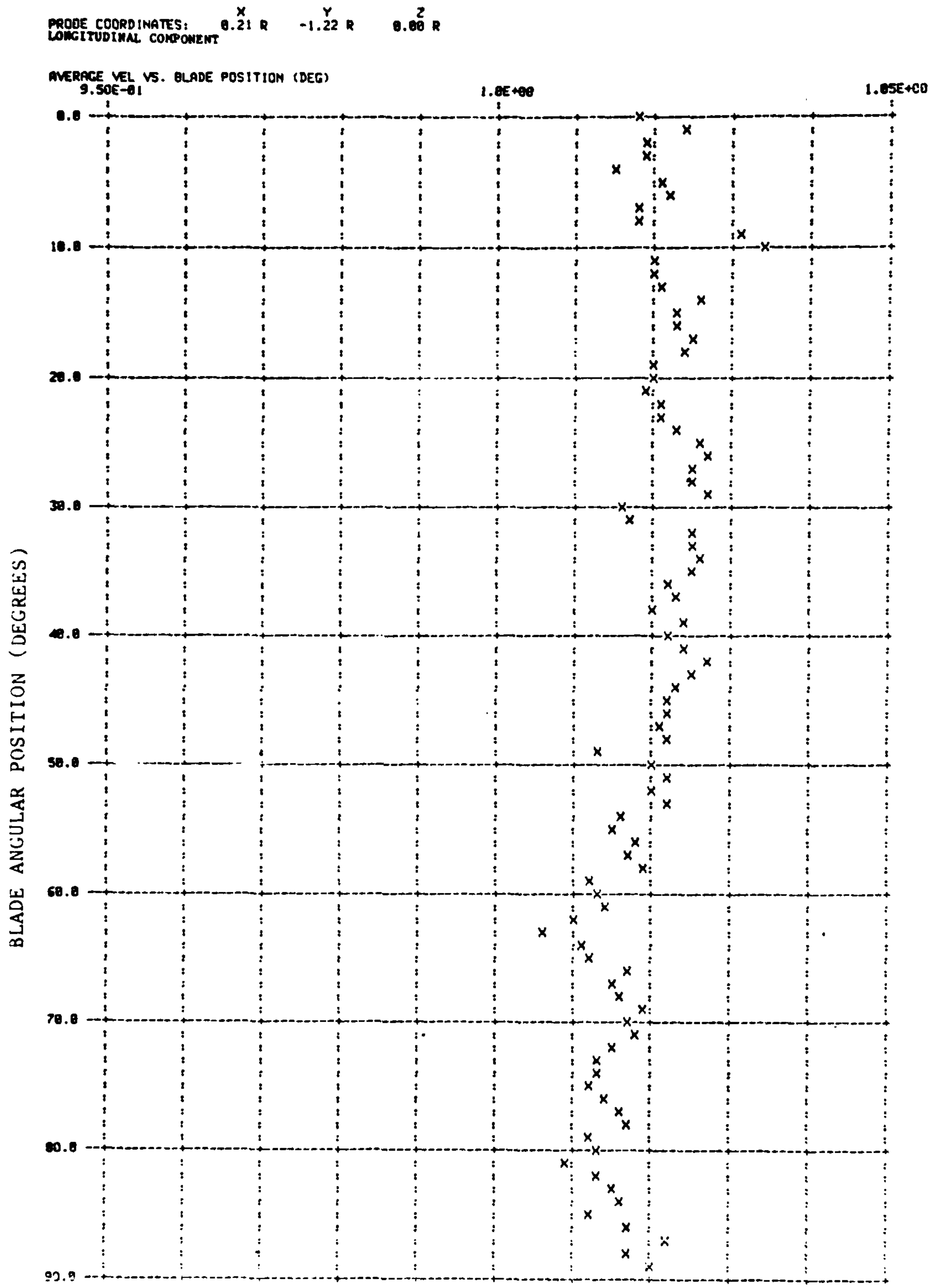

Figure 45a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

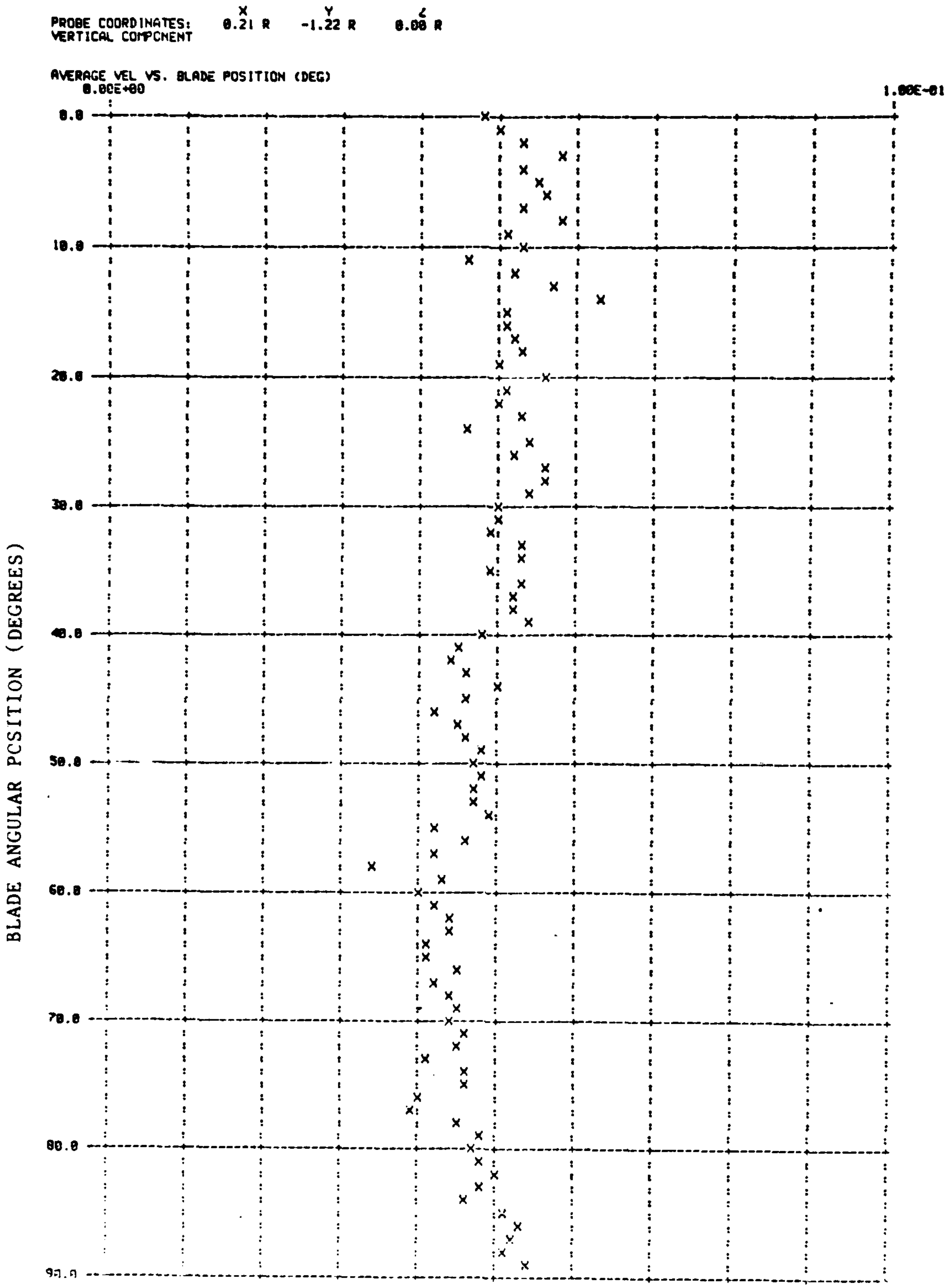

Figure 45b - Computer Generated Graph of Vertical Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

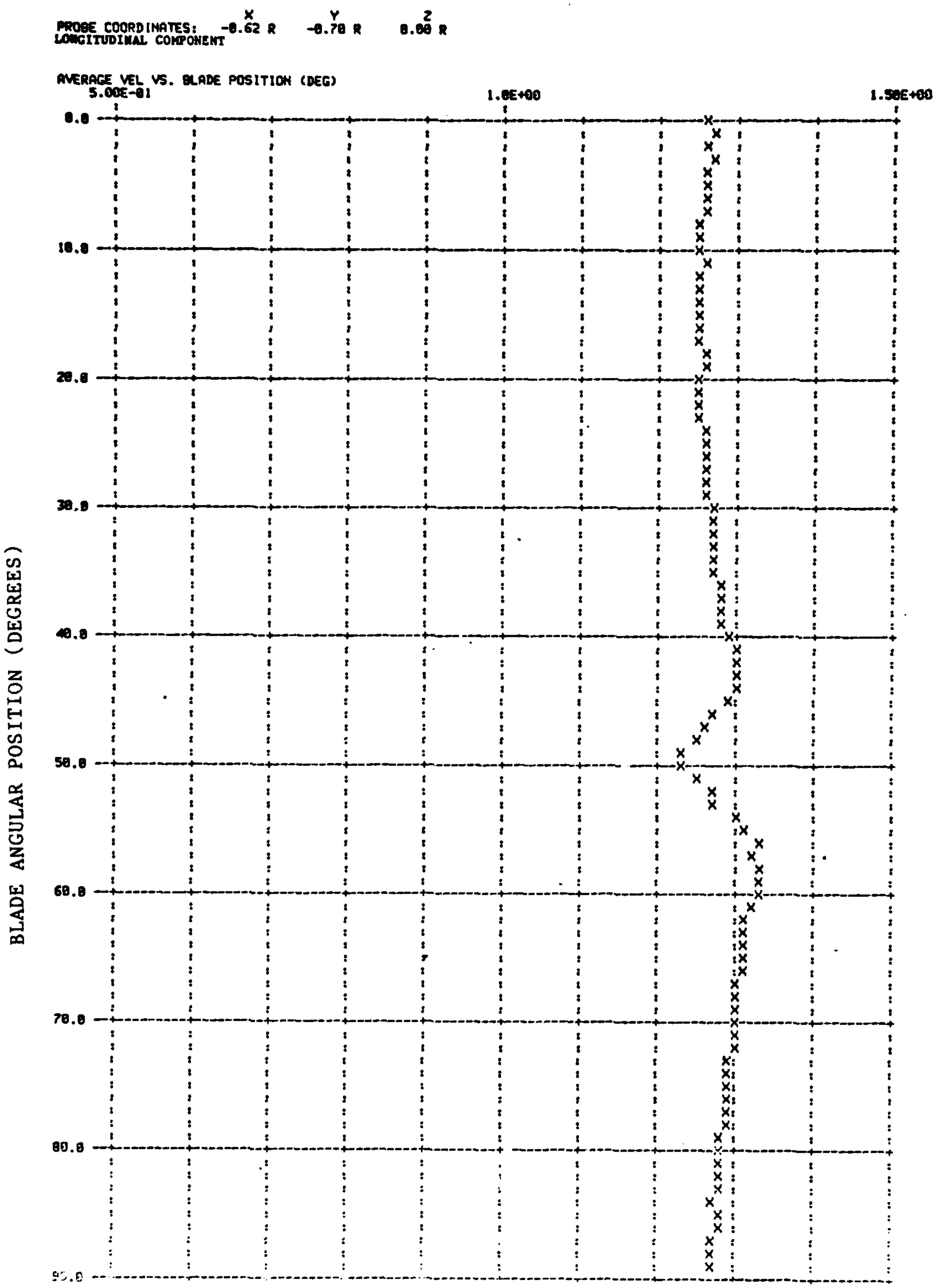

Figure 46a - Computer Generated Graph of Longitudinal Velocity vs. Blade Angular Position at Shaft Inclination of Zero Degrees

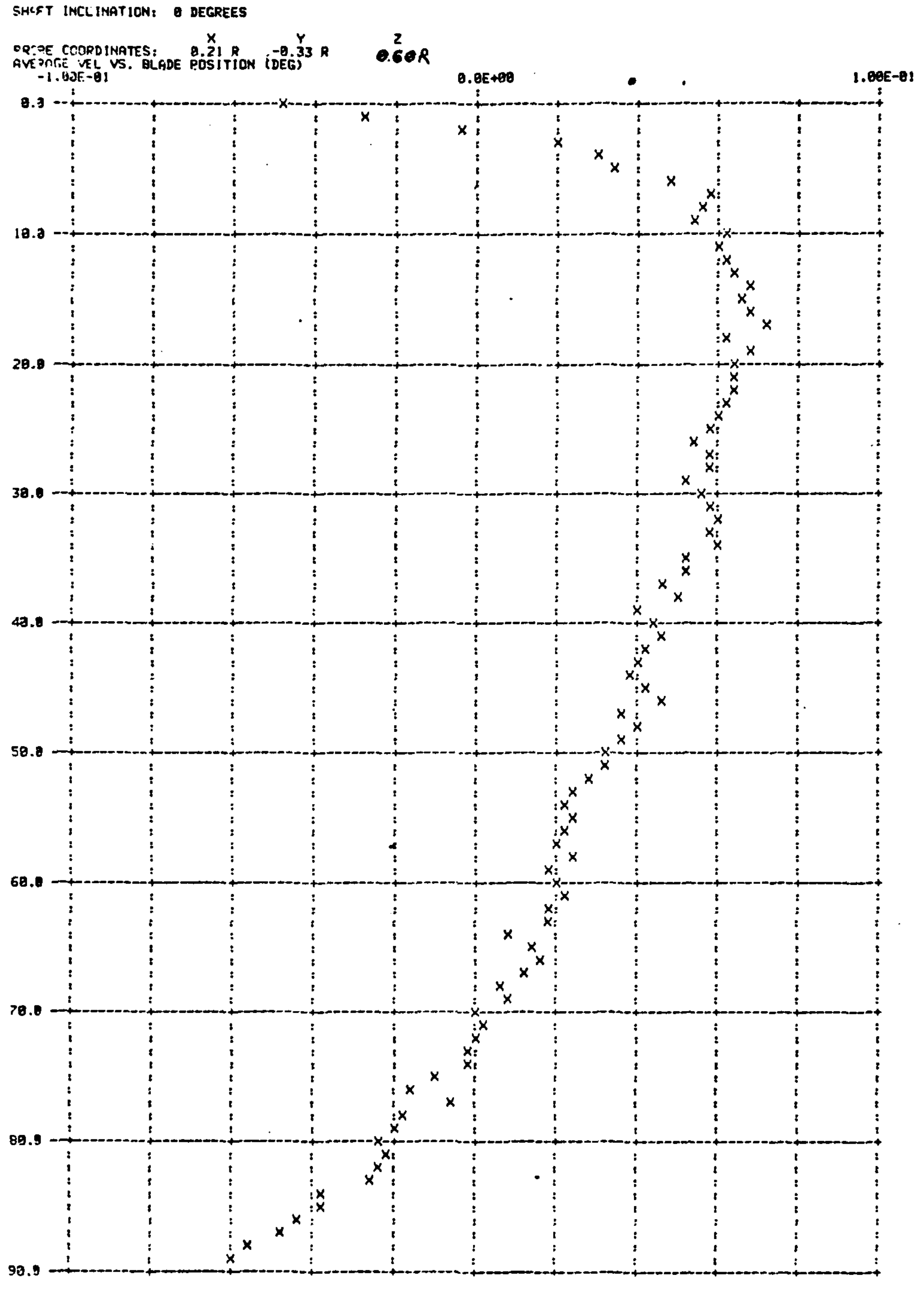

Figure 47 - Computer Generated Graph of Tangential Velocity Component vs. Blade Angular Postion

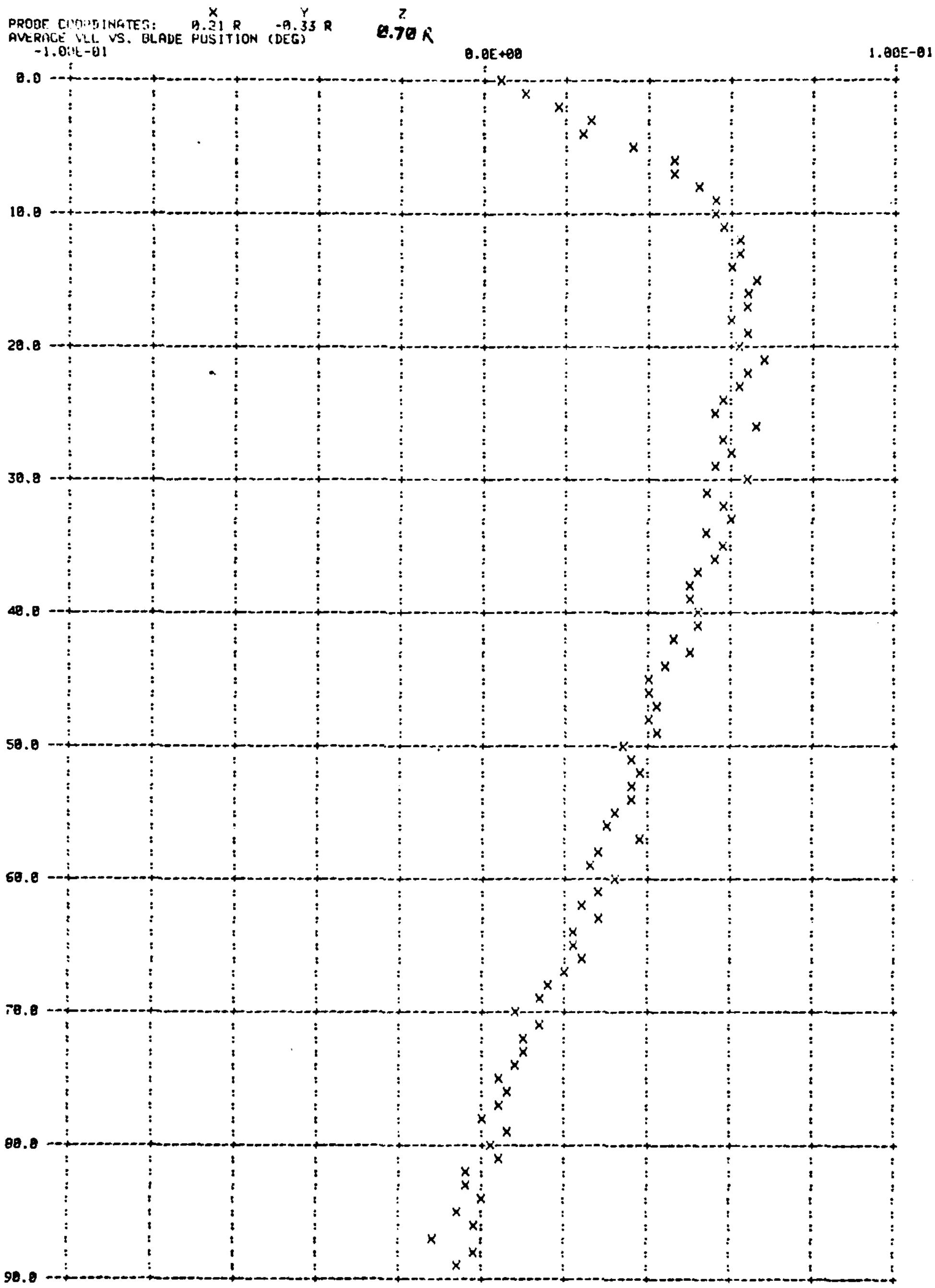

Figure 48 - Computer Generated Graph of Tangential Velocity Component vs. Blade Angular Position

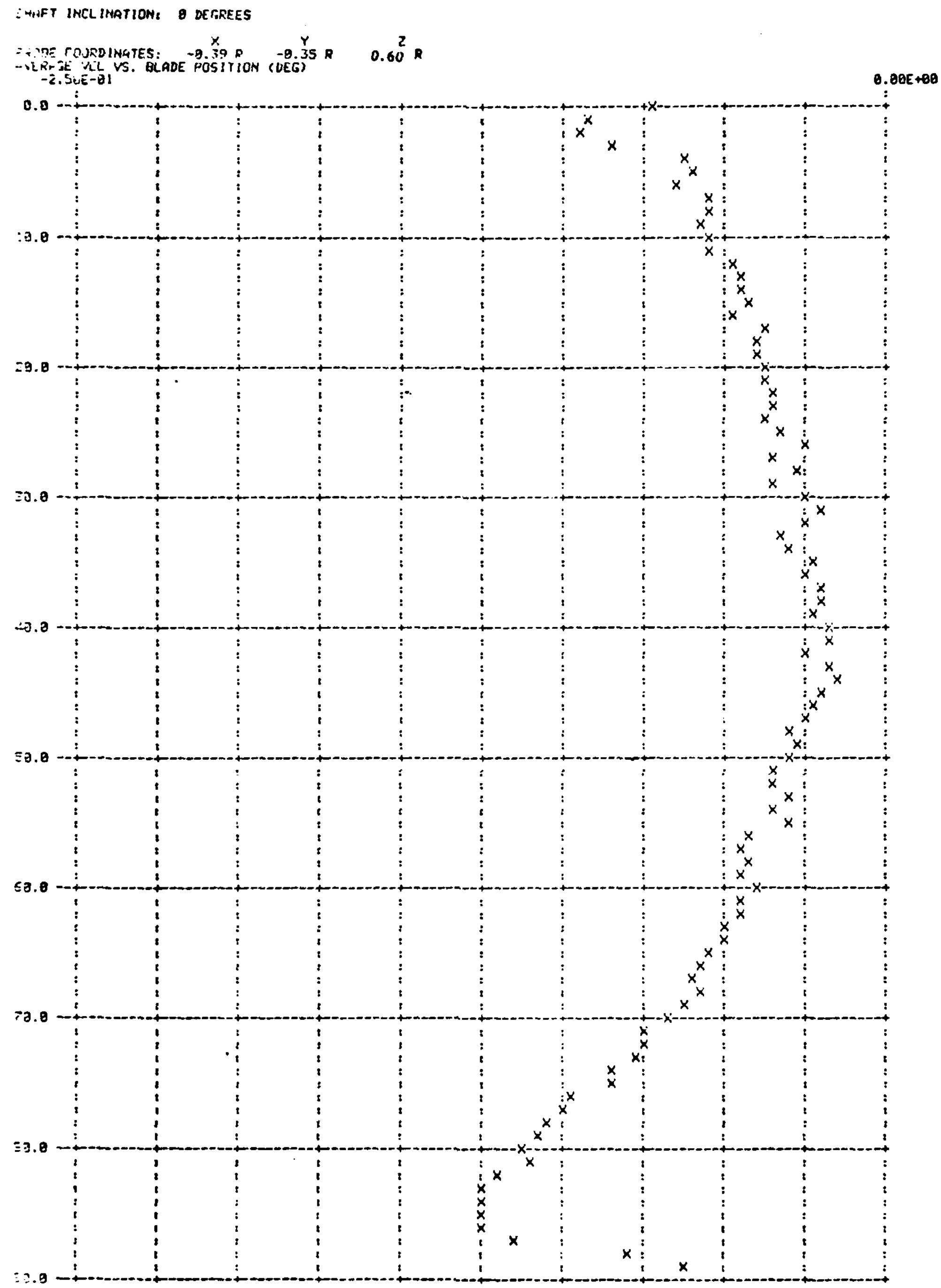

Figure 49 - Computer Generated Graph of Tangential Velocity Component vs. Blade Angular Position

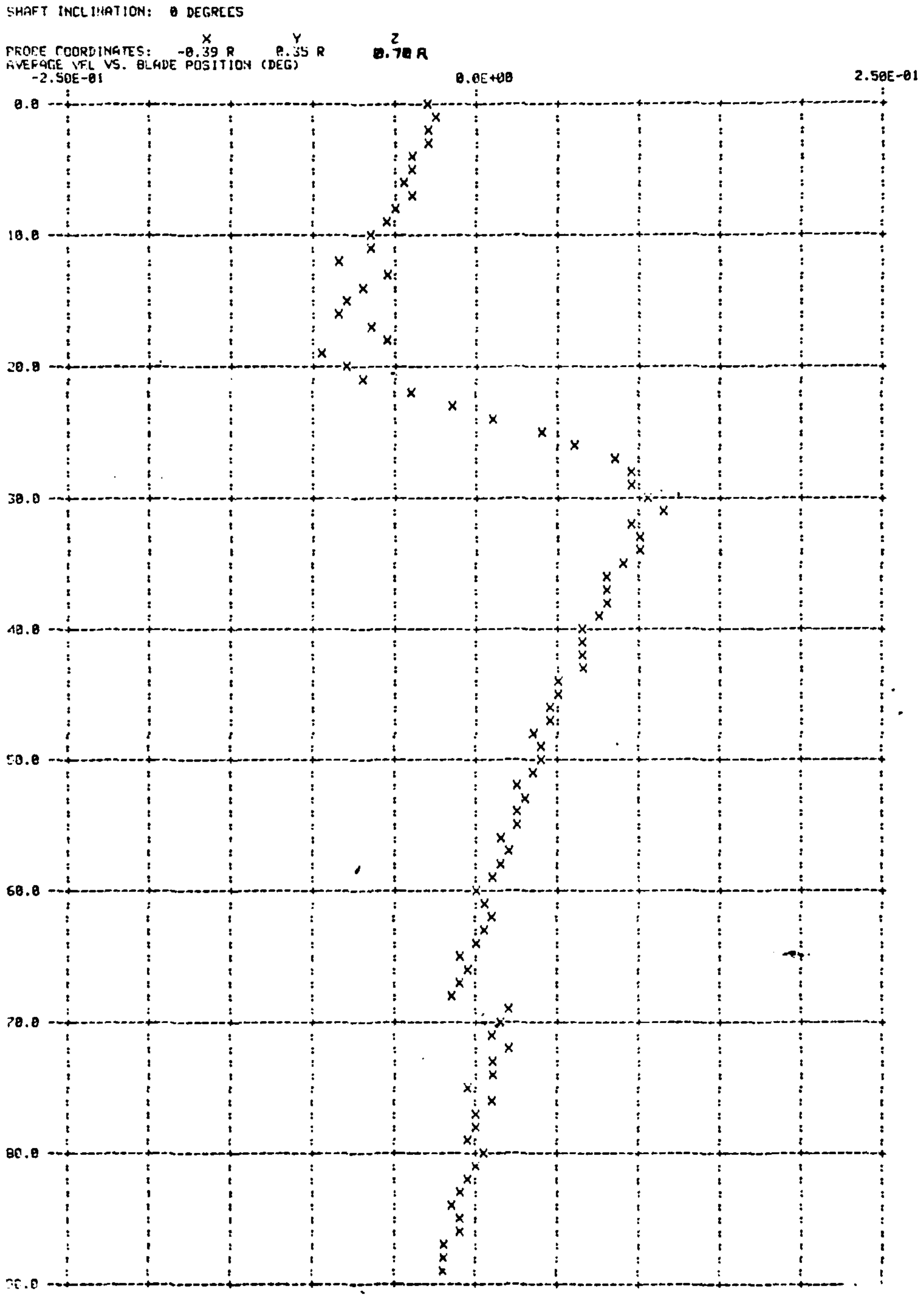

Figure 50 - Computer Generated Graph of Tangential Velocity Component vs. Blade Angular Position

APPENDIX A

THE DTNSRDC LDA SYSTEM

For this experiment, a dual beam fringe mode of laser operation was utilized. A Coherent Radiation, Inc. CR-3 argon-ion laser with etalon was adjusted to give an output wavelength of 514.5 nm (green). Before the experiment the laser output was checked with a Spectra-Physics model 110 A scanning optical spectrometer and Coherent Radiation model 410 power meter. As is the case with many argon lasers, the 514.5 nm line was found to be the most stable and most powerful line available from this laser.

The laser beam was directed via mirrors through a TSI, Inc. model 901 polorization rotator, and a model 910 beam splitter. When measuring the longitudinal velocity in the water tunnel, the split beams went directly to a TSI model 991 zoom lens system. When measuring the vertical component, a TSI model 980 frequency shifter was also utilized. The optical arrangement is shown in Figure A1.

Initially the configuration of the water tunnel permitted only backscatter measurements to be taken. Both direct backscatter and slightly off-axis backscatter were tried. The off-axis configuration was found to give a higher signal-to-noise ratio. A TSI collecting lens focused the backscattered radiation onto a TSI model 965 photo-multiplyer (P-M tube).

The signal from the P-M tube was band pass filtered through an Ortec model 402H active filter and fed into a frequency tracker. Both the Disa, Inc. model 55L20 tracker and the TSI model 1090 tracker were

used. The analog output from the tracker was brought into an Interdata Inc. model 7-32 mini-computer via an Analogic model AN 5800 analog to digital converter.

In this configuration, the data rates were too low to obtain time dependent data. A computer code was used to analyze the data and obtain the mean and RMS velocities. After minor tunnel modifications, which allowed forward scatter, only time-dependent measurements were made.

The forward scattered laser signals were picked up by the P-M tube, which mounted on a small, in-house manufactured optical bench. The signal from the P-M tube was band-pass filtered through a TSI 1094-1 filter module and fed into a TSI model 1090 Frequency Tracker. The analog output of the tracker was again brought into the minicomputer, where another computer code analyzed the data. 200 individual data points were taken for each degree of blade position. Thus each graph represents 18,000 data points. Data rates from the frequency tracker were often quite high (about 10,000 points per second), but the computer code allowed a maximum of 2 data points per degree per revolution into memory. This was done so that the data would be "spread out" over many successive propeller revolutions. At the conclusion of a run, the velocities vs. blade angular position were tabulated and graphed by the computer.

Longitudinal and vertical velocity profiles were taken in the vertical and horizontal planes at four different locations along the propeller axis. Vertical and longitudinal horizontal movement was provided by a traverse system manufactured in-house. This system moved the entire optics table, including the laser, as a unit. On-axis horizontal

movement was provided by the zoom lens system. This lens maintains constant beam crossing angle, f number, number of fringes, and measuring volume size. Thus no change in the calibration factors in the computer code is required as the focal length changes. Also, no refocusing of the receiving optics is required while in the direct back scatter mode. However, when using off-axis back scatter, realignment and refocusing is necessary for each change in the measuring volume location in the on-axis direction. When in the forward scatter mode, realignment of the receiving optics was required for each measuring volume position change.

A Quality, Inc. model 500 optical measuring system was used to keep track of the measuring volume relative to the propeller center, The manufacturer gives this instrument an accuracy of ±0.005 in. During the experimental set up this accuracy was independently confirmed.

The accuracy of the data obtained from a given LDA system is dependent on many factors. These include particle concentration in the fluid, variations in fluid velocity across the measuring volume, multiple particle signals, shot noise (from the P-M tube), brownian motion, extraneous reflected light, frequency shifter noise, accuracy of laser wavelength, accuracy of beam crossing angle, optical noise, signal processor noise and accuracy of the data collection system.* For measurements in turbulent flow, all of the above limitations are interrelated and precise quantitative error analysis is, in practical terms,

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* Maya, W.T., "Ocean Laser Velocimeter System: Signal Processing Accuracy by Simulation," Proceedings of The Third International Workshop on Laser Velocimetry, Hemisphere Publishing Corporation, Purdue University (July 1978).

impossible. However, if precautions are taken in the experimental setup to exclude extraneous light sources, for mean velocity measurements the major sources of error are reduced to the following:

1. Accuracy of laser wavelength
2. Accuracy of beam crossing angle
3. Accuracy of frequency shifting system
4. Precision of laser signal processor

As previously mentioned number 1 was measured prior to the investigation. The manufacturer specifications were used to determine the other error ranges. They are 0.01%, 0.1%, 0.02%, and 0.4% for items 1, 2, 3, and 4 respectively.* Therefore the accuracy of mean velocity measurements can be expected to be within 1%.

The RMS velocities are calculated by the mini-computer from the variation of the mean data points (200) for each degree. Since these are relatively small numbers, an additional error results from round-off errors in the calculations. Study of RMS results based upon precisely known simulated laser processor signals fed into the computer indicate an error range of 10% for non-dimensional RMS velocities higher than 0.013. RMS velocities of 0.013 or below cannot be considered reliable, since actual RMS values lower than 0.013 will be calculated as 0.013 by the computer.

While preparing for the experiment, it was suspected that obtaining optimum scattering particles would be a major problem. This was in fact the case for the back-scatter portion of the investigation.

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* Laser Anemometer Systems Catalog, TSI, Inc. (1978).

Analysis of water samples from DTNSRDC water tunnels showed the typical exponential size distribution, ie. large numbers of particles significantly smaller than the fringe spacing (5.2 microns). This seriously degraded the signal-to-noise (S-N) ratio in the backscatter mode. Filtering down to 3 microns and adding artifical seed in the optimum size range (10 to 20 microns) helped considerably. However, the particles below 3 microns still kept the signal-to-noise ratio less than optimum. Fortunately, the large power reserve of our laser in the forward scatter mode, allowed a sufficiently large signal-to-noise ratio and thus data rate, to permit time dependent measurements.

As more efficient filters come onto the market (0.5 micron filters should be commercially available for the DTNSRDC water tunnels within a year) still better signal-to-noise ratios will be attainable.

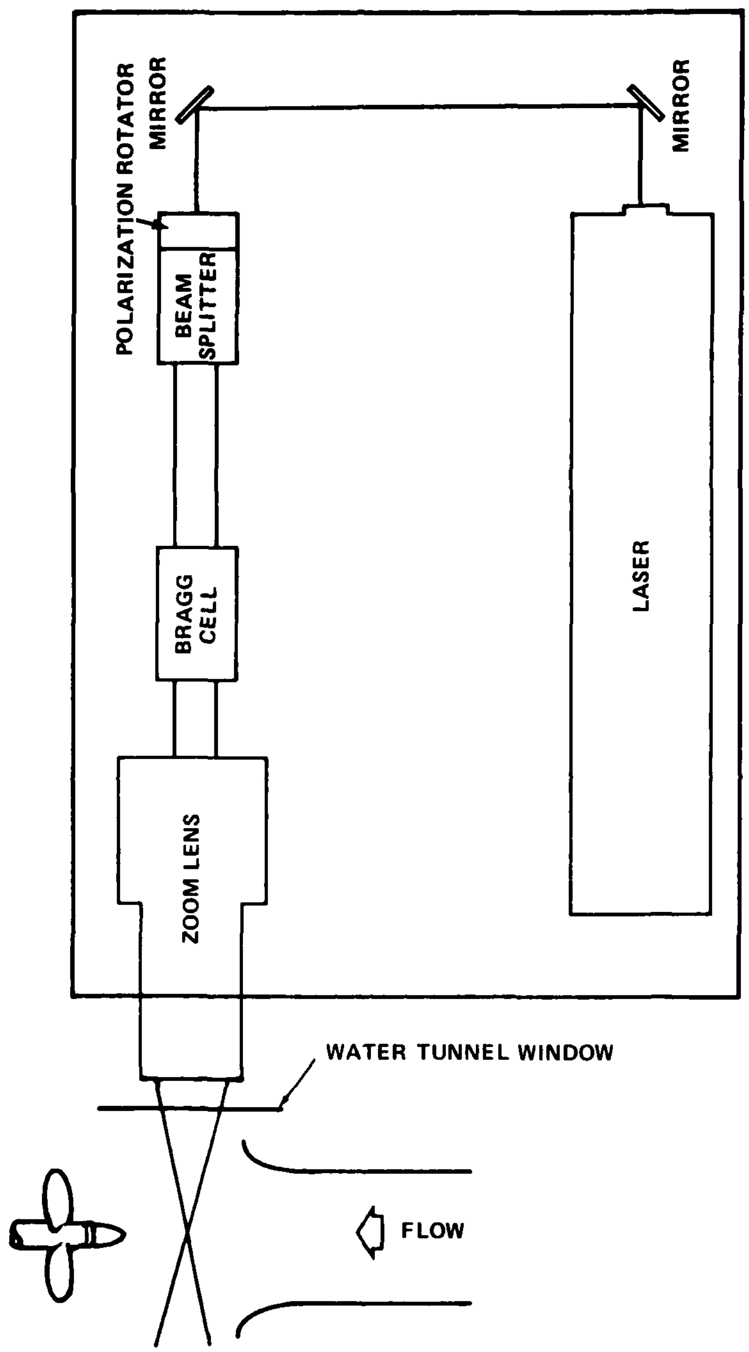

Figure A1 - Sketch of Optical Arrangement

APPENDIX B

TABLES OF NUMERICAL DATA

180-Degree

PROBE COORDINATES: X −0.43 R, Y 0.70 R, Z 0.00 R

LONGITUDINAL COMPONENT DEGREE	AVG VEL	RMS	VERTICAL COMPONENT DEGREE	AVG VEL	RMS
0	1.089	0.136	0	-0.090	0.072
1	1.107	0.139	1	-0.107	0.091
2	1.164	0.114	2	-0.094	0.107
3	1.195	0.090	3	-0.091	0.115
4	1.220	0.050	4	-0.034	0.116
5	1.230	0.035	5	0.057	0.109
6	1.250	0.032	6	0.140	0.104
7	1.266	0.029	7	0.194	0.070
8	1.272	0.025	8	0.210	0.042
9	1.289	0.040	9	0.231	0.034
10	1.297	0.031	10	0.223	0.032
11	1.299	0.035	11	0.232	0.029
12	1.300	0.039	12	0.244	0.034
13	1.293	0.039	13	0.256	0.031
14	1.270	0.035	14	0.274	0.040
15	1.271	0.036	15	0.280	0.046
16	1.260	0.034	16	0.294	0.044
17	1.242	0.035	17	0.315	0.043
18	1.233	0.036	18	0.327	0.053
19	1.200	0.029	19	0.344	0.047
20	1.200	0.030	20	0.354	0.047
21	1.185	0.027	21	0.351	0.046
22	1.179	0.025	22	0.362	0.045
23	1.169	0.025	23	0.360	0.050
24	1.157	0.025	24	0.364	0.047
25	1.154	0.025	25	0.355	0.044
26	1.147	0.021	26	0.347	0.045
27	1.143	0.022	27	0.343	0.042
28	1.137	0.021	28	0.331	0.042
29	1.132	0.021	29	0.326	0.043
30	1.120	0.021	30	0.319	0.040
31	1.119	0.020	31	0.310	0.040
32	1.122	0.019	32	0.315	0.041
33	1.120	0.019	33	0.303	0.041
34	1.110	0.019	34	0.291	0.035
35	1.113	0.020	35	0.284	0.037
36	1.115	0.018	36	0.282	0.035
37	1.113	0.018	37	0.276	0.035
38	1.106	0.020	38	0.270	0.034
39	1.105	0.020	39	0.253	0.029
40	1.106	0.019	40	0.246	0.033
41	1.110	0.017	41	0.241	0.030
42	1.107	0.018	42	0.234	0.040
43	1.105	0.016	43	0.233	0.030
44	1.100	0.017	44	0.230	0.026
45	1.106	0.018	45	0.223	0.026
46	1.104	0.017	46	0.215	0.030
47	1.106	0.019	47	0.210	0.028
48	1.102	0.016	48	0.202	0.027
49	1.101	0.018	49	0.199	0.025
50	1.102	0.017	50	0.191	0.020
51	1.103	0.019	51	0.188	0.025
52	1.100	0.020	52	0.184	0.026
53	1.109	0.019	53	0.173	0.025
54	1.100	0.019	54	0.169	0.025
55	1.106	0.016	55	0.161	0.027
56	1.111	0.019	56	0.162	0.024
57	1.114	0.017	57	0.153	0.026
58	1.109	0.018	58	0.149	0.026
59	1.100	0.018	59	0.142	0.026
60	1.107	0.018	60	0.138	0.024
61	1.111	0.017	61	0.130	0.023
62	1.114	0.016	62	0.128	0.024
63	1.116	0.018	63	0.121	0.024
64	1.115	0.017	64	0.116	0.023
65	1.117	0.017	65	0.115	0.027
66	1.119	0.016	66	0.109	0.025
67	1.120	0.017	67	0.101	0.023
68	1.119	0.016	68	0.094	0.026
69	1.126	0.018	69	0.080	0.026
70	1.129	0.017	70	0.085	0.029
71	1.132	0.017	71	0.079	0.027
72	1.134	0.016	72	0.074	0.027
73	1.135	0.016	73	0.066	0.028
74	1.137	0.016	74	0.059	0.026
75	1.139	0.017	75	0.053	0.029
76	1.140	0.017	76	0.043	0.030
77	1.149	0.017	77	0.037	0.032
78	1.156	0.016	78	0.026	0.034
79	1.159	0.017	79	0.021	0.034
80	1.166	0.017	80	0.009	0.036
81	1.165	0.016	81	0.003	0.033
82	1.167	0.016	82	-0.004	0.030
83	1.173	0.023	83	-0.018	0.032
84	1.177	0.026	84	-0.021	0.037
85	1.183	0.068	85	-0.036	0.030
86	1.163	0.059	86	-0.045	0.039
87	1.137	[illegible]	87	-0.052	0.043
88	1.104	0.117	88	-0.067	0.048
89	1.067	0.113	89	-0.077	0.057
AVG	1.133	0.030	AVG	0.165	0.040
TARE	0.988	0.016	TARE	0.062	0.033

Table B1 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

0-Degree

PROBE COORDINATES: X -0.43 R Y 0.70 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.140	0.125
1	1.155	0.146
2	1.197	0.174
3	1.211	0.193
4	1.276	0.196
5	1.324	0.172
6	1.364	0.146
7	1.367	0.134
8	1.389	0.104
9	1.399	0.083
10	1.412	0.059
11	1.413	0.046
12	1.417	0.033
13	1.421	0.031
14	1.420	0.027
15	1.421	0.020
16	1.422	0.019
17	1.423	0.022
18	1.426	0.021
19	1.429	0.021
20	1.430	0.021
21	1.432	0.023
22	1.432	0.027
23	1.434	0.025
24	1.434	0.027
25	1.434	0.029
26	1.439	0.031
27	1.443	0.034
28	1.443	0.036
29	1.445	0.035
30	1.445	0.037
31	1.450	0.036
32	1.450	0.039
33	1.448	0.038
34	1.449	0.037
35	1.447	0.036
36	1.447	0.037
37	1.441	0.034
38	1.439	0.035
39	1.439	0.035
40	1.435	0.034
41	1.432	0.034
42	1.426	0.030
43	1.421	0.028
44	1.412	0.026
45	1.406	0.024
46	1.399	0.026
47	1.394	0.022
48	1.384	0.021
49	1.380	0.021
50	1.373	0.020
51	1.362	0.019
52	1.358	0.019
53	1.354	0.019
54	1.347	0.020
55	1.339	0.017
56	1.333	0.017
57	1.333	0.017
58	1.328	0.017
59	1.317	0.016
60	1.313	0.019
61	1.306	0.017
62	1.301	0.019
63	1.300	0.018
64	1.295	0.018
65	1.294	0.020
66	1.290	0.019
67	1.287	0.020
68	1.284	0.021
69	1.281	0.023
70	1.279	0.022
71	1.276	0.024
72	1.277	0.023
73	1.276	0.024
74	1.274	0.026
75	1.274	0.026
76	1.272	0.025
77	1.276	0.028
78	1.274	0.030
79	1.277	0.031
80	1.277	0.033
81	1.278	0.035
82	1.262	0.040
83	1.281	0.045
84	1.281	0.055
85	1.263	0.061
86	1.241	0.066
87	1.219	0.079
88	1.174	0.100
89	1.151	0.111
AVG	1.339	0.044
TARE	0.950	0.035

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.419	0.104
1	0.397	0.106
2	0.368	0.098
3	0.327	0.077
4	0.319	0.056
5	0.306	0.061
6	0.306	0.059
7	0.301	0.056
8	0.298	0.035
9	0.300	0.051
10	0.293	0.047
11	0.295	0.044
12	0.295	0.049
13	0.291	0.050
14	0.296	0.043
15	0.301	0.051
16	0.292	0.040
17	0.292	0.050
18	0.293	0.048
19	0.288	0.049
20	0.283	0.048
21	0.284	0.044
22	0.286	0.046
23	0.281	0.048
24	0.282	0.042
25	0.280	0.041
26	0.280	0.039
27	0.272	0.041
28	0.257	0.033
29	0.251	0.035
30	0.249	0.031
31	0.240	0.027
32	0.236	0.031
33	0.220	0.026
34	0.215	0.042
35	0.203	0.028
36	0.193	0.028
37	0.197	0.041
38	0.192	0.027
39	0.184	0.028
40	0.177	0.029
41	0.166	0.029
42	0.159	0.031
43	0.156	0.031
44	0.150	0.032
45	0.156	0.047
46	0.145	0.027
47	-----	-----
48	0.149	0.032
49	0.144	0.030
50	0.144	0.029
51	0.143	0.031
52	0.142	0.029
53	0.150	0.029
54	0.148	0.030
55	0.148	0.032
56	0.148	0.028
57	0.152	0.028
58	0.162	0.031
59	0.162	0.029
60	0.165	0.030
61	0.172	0.027
62	0.171	0.029
63	0.181	0.029
64	0.183	0.028
65	0.187	0.028
66	0.194	0.029
67	0.197	0.029
68	0.210	0.030
69	0.212	0.027
70	0.217	0.026
71	0.227	0.026
72	0.230	0.028
73	0.238	0.031
74	0.249	0.029
75	0.255	0.030
76	0.261	0.032
77	0.270	0.027
78	0.276	0.030
79	0.285	0.032
80	0.295	0.041
81	0.312	0.054
82	0.321	0.066
83	0.349	[illegible]
84	0.372	0.102
85	0.423	0.109
86	0.434	0.114
87	0.472	0.099
88	0.470	0.109
89	0.445	0.102
AVG	0.251	0.044
TARE	0.070	0.049

Table B2 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

Table B3 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

180-Degree

PROBE COORDINATES: X 0.21 R Y 0.70 R Z 0.00 R

LONGITUDINAL COMPONENT			VERTICAL COMPONENT		
DEGREE	AVG VEL	RMS	DEGREE	AVG VEL	RMS
0	0.955	0.064	0	0.091	0.050
1	0.982	0.029	1	0.066	0.051
2	1.010	0.015	2	0.061	0.056
3	1.025	0.012	3	0.055	0.055
4	1.040	0.010	4	0.059	0.043
5	1.049	0.009	5	0.066	0.039
6	1.055	0.009	6	0.064	0.040
7	1.063	0.009	7	0.067	0.037
8	1.069	0.010	8	0.083	0.045
9	1.079	0.010	9	0.079	0.038
10	1.085	0.011	10	0.080	0.036
11	1.087	0.010	11	0.087	0.042
12	1.092	0.011	12	0.090	0.042
13	1.096	0.010	13	0.095	0.043
14	1.099	0.011	14	0.093	0.037
15	1.105	0.012	15	0.097	0.039
16	1.104	0.010	16	0.105	0.039
17	1.108	0.012	17	0.104	0.040
18	1.113	0.011	18	0.111	0.042
19	1.119	0.013	19	0.105	0.034
20	1.120	0.013	20	0.109	0.042
21	1.122	0.011	21	0.113	0.043
22	1.123	0.011	22	0.114	0.039
23	1.125	0.011	23	0.112	0.041
24	1.126	0.011	24	0.118	0.046
25	1.127	0.012	25	0.123	0.042
26	1.126	0.011	26	0.125	0.044
27	1.126	0.012	27	0.120	0.038
28	1.129	0.012	28	0.122	0.039
29	1.135	0.012	29	0.129	0.037
30	1.133	0.012	30	0.130	0.043
31	1.136	0.011	31	0.130	0.038
32	1.137	0.012	32	0.129	0.034
33	1.139	0.012	33	0.137	0.041
34	1.141	0.012	34	0.128	0.036
35	1.138	0.012	35	0.141	0.045
36	1.139	0.012	36	0.144	0.037
37	1.141	0.012	37	0.135	0.036
38	1.141	0.014	38	0.142	0.038
39	1.140	0.013	39	0.142	0.035
40	1.143	0.014	40	0.139	0.036
41	1.138	0.015	41	0.141	0.039
42	1.131	0.012	42	0.139	0.037
43	1.134	0.011	43	0.143	0.040
44	1.141	0.012	44	0.144	0.043
45	1.140	0.013	45	0.146	0.041
46	1.143	0.013	46	0.153	0.038
47	1.139	0.013	47	0.148	0.042
48	1.139	0.014	48	0.150	0.041
49	1.143	0.014	49	0.147	0.039
50	1.144	0.013	50	0.146	0.039
51	1.142	0.013	51	0.146	0.043
52	1.140	0.013	52	0.156	0.047
53	1.143	0.017	53	0.146	0.039
54	1.142	0.014	54	0.151	0.040
55	1.143	0.013	55	0.148	0.036
56	1.147	0.013	56	0.149	0.042
57	1.147	0.013	57	0.148	0.041
58	1.147	0.014	58	0.145	0.035
59	1.144	0.013	59	0.152	0.040
60	1.145	0.012	60	0.150	0.038
61	1.144	0.013	61	0.150	0.035
62	1.145	0.012	62	0.145	0.039
63	1.140	0.015	63	0.151	0.038
64	1.136	0.012	64	0.149	0.037
65	1.132	0.013	65	0.146	0.040
66	1.140	0.015	66	0.145	0.039
67	1.134	0.015	67	0.153	0.041
68	1.127	0.017	68	0.149	0.041
69	1.116	0.019	69	0.153	0.049
70	-----	-----	70	0.149	0.040
71	-----	-----	71	0.154	0.044
72	1.117	0.040	72	0.150	0.045
73	1.119	0.039	73	0.143	0.039
74	1.121	0.033	74	0.145	0.041
75	1.112	0.041	75	0.140	0.042
76	1.119	0.036	76	0.143	0.042
77	1.119	0.030	77	0.143	0.042
78	1.122	0.034	78	0.140	0.038
79	1.119	0.045	79	0.142	0.040
80	1.125	0.037	80	0.138	0.041
81	1.113	0.048	81	0.138	0.045
82	1.139	0.015	82	0.142	0.041
83	1.118	0.041	83	0.138	0.041
84	1.129	0.021	84	0.129	0.046
85	1.128	0.010	85	0.131	0.047
86	1.123	0.018	86	0.129	0.048
87	1.115	0.034	87	0.117	0.044
88	1.075	0.009	88	0.110	0.049
89	0.992	0.091	89	0.106	0.040
AVG	1.116	0.019	AVG	0.126	0.041
TARE	1.002	0.022	TARE	0.048	0.038

PROBE COORDINATES: X −0.39 R, Y 0.50 R, Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.959	0.034
1	0.965	0.038
2	0.963	0.046
3	0.981	0.066
4	0.992	0.070
5	1.015	0.075
6	1.035	0.083
7	1.044	0.087
8	1.057	0.072
9	1.071	0.072
10	1.070	0.073
11	1.087	0.081
12	1.076	0.058
13	1.080	0.056
14	1.076	0.051
15	1.085	0.052
16	1.083	0.050
17	1.085	0.046
18	1.079	0.037
19	1.082	0.037
20	1.084	0.040
21	1.085	0.036
22	1.083	0.031
23	1.083	0.033
24	1.086	0.026
25	-----	-----
26	-----	-----
27	-----	-----
28	-----	-----
29	-----	-----
30	-----	-----
31	-----	-----
32	1.081	0.026
33	1.085	0.026
34	1.079	0.025
35	1.075	0.025
36	1.075	0.025
37	1.074	0.024
38	1.069	0.024
39	1.066	0.022
40	1.067	0.020
41	1.066	0.020
42	1.059	0.023
43	1.063	0.021
44	1.056	0.019
45	1.056	0.023
46	1.055	0.022
47	1.054	0.022
48	1.050	0.023
49	1.045	0.023
50	1.047	0.019
51	1.044	0.020
52	1.040	0.020
53	1.039	0.021
54	-----	-----
55	-----	-----
56	-----	-----
57	1.038	0.020
58	1.037	0.021
59	1.034	0.022
60	1.034	0.020
61	1.030	0.021
62	1.027	0.023
63	1.022	0.021
64	-----	-----
65	-----	-----
66	1.022	0.020
67	1.021	0.021
68	-----	-----
69	1.014	0.020
70	1.012	0.020
71	1.010	0.024
72	1.011	0.023
73	1.008	0.021
74	1.010	0.019
75	1.005	0.022
76	1.004	0.022
77	1.003	0.023
78	0.998	0.024
79	0.999	0.024
80	0.997	0.022
81	0.989	0.024
82	-----	-----
83	0.986	0.025
84	0.982	0.023
85	0.976	0.027
86	0.975	0.019
87	0.971	0.024
88	0.966	[illegible]
89	0.967	0.025
AVG	1.037	0.031
TARE	1.004	0.019

VERTICAL COMPONENT

180-Degree

DEGREE	AVG VEL	RMS
0	0.376	0.030
1	0.389	0.032
2	0.390	0.030
3	0.395	0.033
4	0.400	0.034
5	0.412	0.034
6	0.409	0.041
7	0.411	0.041
8	0.404	0.050
9	0.391	0.068
10	0.385	0.091
11	0.352	0.119
12	0.323	0.141
13	0.297	0.151
14	0.203	0.147
15	0.192	0.168
16	0.150	0.142
17	0.123	0.134
18	0.108	0.115
19	0.096	0.113
20	0.104	0.114
21	-----	-----
22	0.097	0.080
23	0.097	0.049
24	0.099	0.061
25	0.108	0.059
26	0.112	0.062
27	0.115	0.054
28	-----	-----
29	0.136	0.064
30	0.130	0.033
31	0.130	0.040
32	0.135	0.044
33	0.130	0.046
34	0.134	0.034
35	0.142	0.047
36	0.151	0.039
37	0.150	0.049
38	0.150	0.035
39	0.155	0.043
40	0.154	0.029
41	0.150	0.033
42	0.155	0.052
43	0.162	0.034
44	0.163	0.035
45	0.171	0.051
46	0.173	0.057
47	0.171	0.032
48	0.175	0.035
49	0.173	0.030
50	0.180	0.032
51	0.184	0.029
52	0.181	0.032
53	0.187	0.033
54	0.192	0.042
55	0.198	0.045
56	0.200	0.030
57	0.205	0.030
58	0.207	0.030
59	0.210	0.048
60	0.216	0.028
61	0.218	0.030
62	0.223	0.028
63	0.224	0.023
64	0.232	0.030
65	0.233	0.032
66	0.235	0.029
67	0.247	0.028
68	0.249	0.030
69	0.255	0.027
70	0.256	0.029
71	0.264	0.030
72	0.262	0.029
73	0.276	0.030
74	0.280	[illegible]
75	0.287	0.028
76	0.287	0.030
77	0.295	0.030
78	0.302	0.029
79	0.308	0.027
80	0.319	0.032
81	0.322	0.029
82	0.329	0.031
83	0.336	0.031
84	-----	-----
85	0.343	0.029
86	0.355	0.030
87	0.358	0.028
88	0.360	0.032
89	0.374	0.031
AVG	0.234	0.049
TARE	0.111	0.029

Table B4 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

PROBE COORDINATES: X -0.39 R Y 0.00 R Z 0.00 R

180-Degree

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.278	0.115
1	1.282	0.096
2	1.286	0.066
3	1.288	0.052
4	1.281	0.051
5	1.277	0.049
6	1.273	0.046
7	1.269	0.045
8	1.264	0.043
9	1.261	0.041
10	1.255	0.038
11	1.252	0.038
12	1.250	0.037
13	1.246	0.037
14	1.244	0.035
15	1.240	0.036
16	1.237	0.035
17	1.233	0.034
18	1.232	0.033
19	1.228	0.033
20	1.228	0.031
21	1.222	0.030
22	1.224	0.032
23	1.222	0.030
24	1.217	0.029
25	1.218	0.026
26	1.216	0.028
27	1.212	0.025
28	1.211	0.026
29	1.207	0.023
30	1.207	0.026
31	1.208	0.023
32	1.206	0.024
33	1.204	0.022
34	1.201	0.022
35	1.202	0.023
36	1.200	0.020
37	1.199	0.020
38	1.197	0.018
39	1.198	0.021
40	1.194	0.020
41	1.198	0.019
42	1.195	0.019
43	1.195	0.019
44	1.196	0.018
45	1.196	0.018
46	1.190	0.015
47	1.194	0.017
48	1.195	0.014
49	1.197	0.015
50	1.199	0.015
51	1.199	0.015
52	1.202	0.016
53	1.203	0.016
54	1.205	0.015
55	1.204	0.014
56	1.207	0.016
57	1.209	0.015
58	1.212	0.016
59	1.213	0.017
60	1.218	0.015
61	1.220	0.017
62	1.221	0.016
63	1.222	0.016
64	1.222	0.019
65	1.227	0.020
66	1.228	0.020
67	1.230	0.022
68	-----	-----
69	-----	-----
70	-----	-----
71	-----	-----
72	-----	-----
73	-----	-----
74	1.262	0.039
75	1.270	0.045
76	1.278	0.046
77	1.282	0.052
78	1.295	0.054
79	1.302	0.055
80	1.309	0.060
81	1.315	0.067
82	1.326	0.073
83	1.315	0.090
84	1.287	0.092
85	1.262	0.122
86	1.231	0.124
87	1.254	0.123
88	1.272	0.11[illegible]
89	1.263	0.10[illegible]
AVG	1.2[illegible]	0.0[illegible]
TARE	0.985	0.015

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.101	0.127
1	0.154	0.137
2	0.203	0.147
3	0.225	0.129
4	0.247	0.114
5	0.278	0.059
6	0.287	0.043
7	0.288	0.034
8	0.278	0.029
9	0.269	0.030
10	0.263	0.029
11	0.264	0.028
12	0.266	0.030
13	0.261	0.030
14	0.254	0.031
15	0.255	0.027
16	0.248	0.030
17	0.246	0.030
18	0.245	0.029
19	0.243	0.028
20	0.242	0.028
21	0.241	0.026
22	0.239	0.029
23	0.237	0.030
24	0.238	0.029
25	0.233	0.029
26	0.229	0.025
27	0.227	0.027
28	0.229	0.028
29	0.223	0.025
30	0.222	0.027
31	0.227	0.029
32	0.220	0.030
33	0.220	0.030
34	0.221	0.028
35	0.214	0.029
36	0.211	0.027
37	0.213	0.029
38	0.211	0.025
39	0.209	0.027
40	0.204	0.025
41	0.209	0.027
42	0.207	0.029
43	0.206	0.030
44	0.200	0.029
45	0.204	0.027
46	0.199	0.024
47	0.201	0.030
48	0.205	0.029
49	0.195	0.027
50	0.196	0.027
51	0.193	0.032
52	0.188	0.028
53	0.193	0.028
54	0.190	0.028
55	0.191	0.026
56	0.189	0.026
57	0.188	0.026
58	0.182	0.027
59	0.185	0.028
60	0.184	0.030
61	0.189	0.028
62	0.183	0.026
63	0.186	0.027
64	0.179	0.028
65	0.183	0.027
66	0.182	0.027
67	0.177	0.027
68	0.175	0.026
69	0.171	0.026
70	0.177	0.026
71	0.173	0.029
72	0.175	0.028
73	0.175	0.025
74	0.175	0.024
75	0.175	0.026
76	0.178	0.027
77	0.170	0.025
78	0.179	0.022
79	0.175	0.030
80	0.17[illegible]	0.023
81	0.170	0.027
82	0.17[illegible]	0.031
83	0.179	0.035
84	0.17[illegible]	0.033
85	0.17[illegible]	0.039
86	0.167	0.051
87	0.162	0.077
88	0.12[illegible]	0.101
89	0.29[illegible]	0.120
AVG	0.205	0.057
TARE	0.062	0.033

Table B5 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

180-Degree

PROBE COORDINATES: X −0.39 R Y 0.90 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.232	0.101
1	1.269	0.090
2	1.274	0.064
3	1.275	0.040
4	1.267	0.043
5	1.265	0.026
6	1.263	0.032
7	1.257	0.032
8	1.254	0.034
9	1.251	0.033
10	1.248	0.035
11	1.246	0.035
12	1.246	0.030
13	1.240	0.034
14	1.241	0.035
15	1.237	0.034
16	1.233	0.035
17	1.231	0.035
18	1.228	0.034
19	1.224	0.032
20	1.223	0.032
21	1.219	0.029
22	1.216	0.030
23	1.216	0.030
24	1.209	0.030
25	1.209	0.030
26	1.204	0.028
27	1.200	0.029
28	1.197	0.026
29	1.197	0.027
30	1.196	0.025
31	1.193	0.025
32	1.191	0.023
33	1.189	0.023
34	1.186	0.025
35	1.185	0.021
36	1.182	0.022
37	1.182	0.020
38	1.181	0.021
39	1.178	0.020
40	1.176	0.020
41	1.175	0.019
42	1.176	0.019
43	1.177	0.019
44	1.173	0.018
45	1.174	0.015
46	1.175	0.015
47	1.178	0.017
48	1.178	0.016
49	1.179	0.014
50	1.177	0.013
51	1.177	0.014
52	1.178	0.015
53	1.178	0.013
54	1.181	0.013
55	1.180	0.014
56	1.177	0.015
57	1.179	0.014
58	1.182	0.015
59	1.185	0.015
60	1.186	0.015
61	1.189	0.016
62	1.191	0.017
63	1.193	0.016
64	1.195	0.018
65	1.200	0.017
66	1.202	0.019
67	1.204	0.020
68	1.205	0.023
69	1.209	0.021
70	1.217	0.023
71	1.221	0.025
72	1.226	0.025
73	1.233	0.027
74	1.238	0.026
75	1.246	0.029
76	1.250	0.031
77	1.259	0.031
78	1.269	0.033
79	1.276	0.035
80	1.293	0.036
81	1.280	0.037
82	1.298	0.040
83	1.309	0.046
84	1.313	0.053
85	1.294	0.075
86	1.268	0.100
87	1.216	0.132
88	1.170	0.126
89	1.191	0.150
AVG	1.217	0.032
TARE	0.986	0.018

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.019	0.145
1	0.098	0.139
2	0.160	0.149
3	0.232	0.122
4	0.264	0.102
5	0.280	0.091
6	0.287	0.078
7	0.286	0.076
8	0.280	0.073
9	0.283	0.062
10	0.278	0.059
11	0.281	0.055
12	0.276	0.043
13	0.278	0.049
14	0.271	0.049
15	0.270	0.042
16	0.269	0.039
17	0.262	0.045
18	0.267	0.038
19	0.266	0.040
20	0.266	0.036
21	0.265	0.034
22	0.257	0.056
23	0.257	0.034
24	0.259	0.035
25	0.258	0.033
26	0.250	0.035
27	0.247	0.033
28	0.247	0.037
29	0.244	0.035
30	0.245	0.037
31	0.243	0.032
32	0.237	0.034
33	0.236	0.036
34	0.235	0.033
35	0.228	0.032
36	0.228	0.036
37	0.225	0.033
38	0.222	0.033
39	0.222	0.034
40	0.211	0.033
41	0.210	0.034
42	0.204	0.033
43	0.206	0.033
44	0.199	0.033
45	0.196	0.035
46	0.192	0.033
47	0.193	0.035
48	0.187	0.034
49	0.186	0.033
50	0.178	0.033
51	0.178	0.035
52	0.173	0.028
53	0.169	0.033
54	0.168	0.031
55	0.164	0.032
56	0.161	0.033
57	0.159	0.033
58	0.151	0.033
59	0.151	0.032
60	0.146	0.032
61	0.143	0.031
62	0.144	0.032
63	0.137	0.030
64	0.129	0.031
65	0.124	0.032
66	0.123	0.030
67	0.121	0.030
68	0.117	0.025
69	0.111	0.032
70	0.110	0.033
71	0.106	0.032
72	0.101	0.033
73	0.096	0.032
74	0.096	0.035
75	0.088	0.035
76	0.086	0.039
77	0.081	0.041
78	0.075	0.042
79	0.075	0.042
80	0.073	0.045
81	0.063	0.050
82	0.063	0.052
83	0.055	0.057
84	0.058	0.057
85	0.053	0.065
86	0.045	0.077
87	0.032	0.102
88	0.021	0.137
89	0.019	0.143
AVG	0.179	0.040
TARE	0.060	0.031

Table B6 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

Table B7 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

0-Degree

PROBE COORDINATES: X -0.39 R, Y 0.50 R, Z 0.00 R

LONGITUDINAL COMPONENT DEGREE	AVG VEL	RMS	VERTICAL COMPONENT DEGREE	AVG VEL	RMS
0	1.288	0.111	0	0.309	0.026
1	1.312	0.056	1	0.301	0.029
2	1.323	0.037	2	0.296	0.028
3	1.326	0.025	3	0.290	0.029
4	1.320	0.020	4	0.285	0.026
5	1.315	0.020	5	0.282	0.026
6	1.314	0.016	6	0.278	0.027
7	1.311	0.015	7	0.277	0.025
8	1.306	0.018	8	0.274	0.026
9	1.302	0.015	9	0.267	0.026
10	1.298	0.015	10	0.263	0.025
11	1.296	0.015	11	0.260	0.024
12	1.291	0.016	12	0.258	0.026
13	1.290	0.016	13	0.255	0.025
14	1.289	0.017	14	0.254	0.027
15	1.284	0.015	15	0.248	0.024
16	1.281	0.014	16	0.244	0.024
17	1.281	0.016	17	0.244	0.023
18	1.276	0.016	18	0.239	0.024
19	1.272	0.018	19	0.238	0.025
20	1.271	0.016	20	0.232	0.024
21	1.267	0.015	21	0.230	0.025
22	1.265	0.017	22	0.227	0.025
23	1.263	0.018	23	0.223	0.023
24	1.257	0.019	24	0.220	0.025
25	1.255	0.017	25	0.217	0.026
26	1.250	0.017	26	0.213	0.025
27	1.249	0.016	27	0.213	0.025
28	1.247	0.017	28	0.208	0.024
29	1.242	0.017	29	0.206	0.025
30	1.241	0.019	30	0.204	0.025
31	1.240	0.018	31	0.203	0.023
32	1.235	0.018	32	0.195	0.025
33	1.232	0.017	33	0.190	0.023
34	1.230	0.018	34	0.189	0.023
35	1.230	0.018	35	0.184	0.023
36	1.228	0.018	36	0.182	0.024
37	1.224	0.017	37	0.181	0.022
38	1.223	0.019	38	0.178	0.022
39	1.220	0.018	39	0.177	0.023
40	1.217	0.019	40	0.174	0.024
41	1.215	0.018	41	0.171	0.023
42	1.211	0.019	42	0.168	0.021
43	1.208	0.020	43	0.165	0.022
44	1.205	0.018	44	0.160	0.024
45	1.201	0.018	45	0.158	0.022
46	1.200	0.018	46	0.155	0.025
47	1.200	0.016	47	0.155	0.023
48	1.195	0.016	48	0.153	0.023
49	1.196	0.016	49	0.148	0.022
50	1.194	0.015	50	0.144	0.022
51	1.192	0.015	51	0.143	0.021
52	1.193	0.019	52	0.143	0.023
53	1.190	0.018	53	0.140	0.022
54	1.189	0.016	54	0.138	0.021
55	1.187	0.015	55	0.136	0.021
56	1.188	0.017	56	0.131	0.023
57	1.187	0.018	57	0.129	0.020
58	1.184	0.016	58	0.127	0.023
59	1.185	0.016	59	0.125	0.019
60	1.183	0.016	60	0.118	0.024
61	1.181	0.016	61	0.120	0.022
62	1.182	0.018	62	0.116	0.024
63	1.181	0.017	63	0.112	0.021
64	1.180	0.017	64	0.110	0.022
65	1.180	0.018	65	0.108	0.023
66	1.183	0.018	66	0.104	0.024
67	1.182	0.019	67	0.098	0.023
68	1.185	0.019	68	0.096	0.025
69	1.184	0.017	69	0.093	0.023
70	1.188	0.019	70	0.090	0.025
71	1.185	0.016	71	0.085	0.024
72	1.189	0.018	72	0.081	0.025
73	1.188	0.018	73	0.077	0.024
74	1.193	0.020	74	0.073	0.023
75	1.198	0.018	75	0.067	0.020
76	1.196	0.019	76	[illegible]	0.027
77	1.204	0.021	77	0.062	0.034
78	1.205	0.021	78	0.053	0.037
79	1.207	0.020	79	0.062	0.055
80	1.210	0.025	80	0.061	0.063
81	1.207	0.038	81	0.093	0.105
82	1.195	0.057	82	0.122	0.124
83	1.167	0.076	83	0.159	0.133
84	1.123	0.103	84	-----	-----
85	1.082	0.120	85	0.310	[illegible]
86	1.073	0.136	86	0.331	0.064
87	1.117	0.104	87	0.320	0.064
88	1.180	0.172	88	0.314	0.049
89	1.227	0.154	89	0.311	0.035
AVG	1.223	0.029	AVG	2.183	0.030
TARE	0.91	0.015	TARE	0.095	0.044

0-Degree

	X	Y	Z
PROBE COORDINATES:	-.39 R	0.80 R	0.00

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.241	0.243
1	1.307	0.230
2	1.355	0.192
3	1.368	0.196
4	1.374	0.186
5	1.417	0.122
6	1.420	0.102
7	1.430	0.091
8	1.442	0.076
9	1.455	0.070
10	1.457	0.073
11	1.474	0.066
12	1.479	0.067
13	1.489	0.068
14	1.498	0.061
15	1.501	0.061
16	1.506	0.062
17	1.500	0.062
18	1.499	0.062
19	1.500	0.062
20	1.491	0.060
21	1.483	0.061
22	1.474	0.059
23	1.465	0.059
24	1.449	0.060
25	1.444	0.060
26	1.427	0.060
27	1.411	0.057
28	1.392	0.056
29	1.383	0.057
30	1.368	0.051
31	1.353	0.052
32	1.341	0.050
33	1.334	0.048
34	1.317	0.047
35	1.311	0.046
36	1.300	0.044
37	1.290	0.041
38	1.278	0.038
39	1.271	0.037
40	1.262	0.034
41	1.255	0.033
42	1.249	0.032
43	1.240	0.031
44	1.233	0.028
45	1.229	0.027
46	1.221	0.026
47	1.221	0.024
48	1.213	0.022
49	1.211	0.020
50	1.206	0.019
51	1.203	0.010
52	1.201	0.019
53	1.196	0.017
54	1.193	0.010
55	1.189	0.017
56	1.188	0.015
57	1.186	0.015
58	1.185	0.014
59	1.184	0.016
60	1.180	0.015
61	1.181	0.015
62	1.181	0.016
63	1.180	0.015
64	1.178	0.017
65	1.175	0.017
66	1.172	0.020
67	1.173	0.022
68	1.174	0.025
69	1.175	0.023
70	1.173	0.127
71	1.176	0.030
72	1.180	0.031
73	1.183	0.033
74	1.186	0.037
75	1.190	0.037
76	1.195	0.039
77	1.198	0.043
78	1.199	0.043
79	1.207	0.049
80	1.204	0.048
81	1.213	0.055
82	1.204	0.058
83	1.206	0.069
84	1.174	0.081
85	1.133	0.095
86	1.112	0.115
87	1.116	0.117
88	1.126	0.176
89	1.187	0.212
AVG	1.280	0.058
TARE	0.950	0.035

VERTICAL COMPONENT

DEGREES	AVG VEL	RMS
0	0.215	0.107
1	0.172	0.067
2	0.160	0.051
3	0.159	0.056
4	0.161	0.051
5	0.160	0.042
6	0.156	0.039
7	0.163	0.037
8	0.161	0.034
9	0.149	0.033
10	0.149	0.035
11	0.137	0.035
12	1.127	0.036
13	0.111	0.033
14	0.099	0.035
15	0.080	0.033
16	0.068	0.035
17	0.053	0.036
18	0.035	0.048
19	0.014	0.033
20	0.007	0.033
21	-0.019	0.032
22	-0.025	0.031
23	-0.040	0.031
24	-0.051	0.029
25	-0.051	0.052
26	-0.057	0.033
27	-0.064	0.027
28	-0.063	0.030
29	-0.061	0.036
30	-0.063	0.030
31	-0.063	0.029
32	-0.061	0.033
33	-0.055	0.032
34	-0.055	0.033
35	-0.051	0.032
36	-0.044	0.034
37	-0.041	0.031
38	-0.033	0.036
39	-0.029	0.035
40	-0.027	0.037
41	-0.017	0.037
42	-0.009	0.037
43	-0.010	0.036
44	0.002	0.035
45	0.003	0.039
46	0.006	0.036
47	0.013	0.030
48	0.022	0.037
49	0.032	0.037
50	0.035	0.035
51	0.041	0.037
52	0.045	0.037
53	0.055	0.035
54	0.066	0.035
55	0.060	0.034
56	0.079	0.033
57	0.085	0.031
58	0.096	0.034
59	0.095	0.033
60	0.103	0.033
61	0.110	0.031
62	0.123	0.034
63	0.135	0.031
64	0.139	0.032
65	0.150	0.032
66	0.162	0.032
67	0.166	0.032
68	0.175	0.033
69	0.189	0.032
70	0.197	0.031
71	0.200	0.031
72	0.219	0.032
73	0.235	0.036
74	0.248	0.036
75	0.260	0.040
76	0.275	0.039
77	0.288	0.053
78	[illegible]	0.040
79	[illegible]	0.046
80	[illegible]	0.055
81	0.340	0.053
82	0.356	0.090
83	0.372	0.110
84	0.371	0.135
85	[illegible]	0.131
86	0.345	0.142
87	0.371	0.160
88	0.277	0.136
89	0.222	0.114
AVG	0.102	[illegible]
TARE	0.070	0.049

Table B8 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

PROBE COORDINATES: X 0.21 R, Y 0.70 R, Z 0.00 R

0-Degree

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.890	0.032
1	0.889	0.034
2	0.929	0.079
3	1.094	0.040
4	1.055	0.066
5	1.060	0.047
6	1.116	0.022
7	1.108	0.022
8	1.018	0.065
9	1.074	0.070
10	1.117	0.020
11	1.118	0.023
12	1.119	0.026
13	1.115	0.023
14	1.119	0.023
15	1.121	0.021
16	1.120	0.021
17	1.125	0.022
18	1.121	0.021
19	1.124	0.023
20	1.123	0.020
21	1.120	0.022
22	1.123	0.022
23	1.124	0.021
24	1.127	0.019
25	1.125	0.020
26	1.121	0.022
27	1.114	0.019
28	1.119	0.020
29	1.120	0.022
30	1.121	0.020
31	1.120	0.021
32	1.118	0.019
33	1.117	0.019
34	1.114	0.019
35	1.118	0.019
36	1.117	0.022
37	1.114	0.021
38	1.112	0.019
39	1.111	0.020
40	1.112	0.020
41	1.113	0.019
42	1.110	0.021
43	1.103	0.019
44	1.104	0.020
45	1.100	0.018
46	1.101	0.019
47	1.099	0.020
48	1.098	0.019
49	1.097	0.018
50	1.096	0.010
51	1.090	0.019
52	1.085	0.017
53	1.082	0.018
54	1.081	0.019
55	1.076	0.018
56	1.076	0.016
57	1.073	0.017
58	1.070	0.018
59	1.065	0.016
60	1.061	0.018
61	1.056	0.018
62	1.050	0.020
63	1.047	0.018
64	1.038	0.018
65	1.032	0.018
66	1.027	0.017
67	1.0[illegible]8	0.016
68	1.023	0.017
69	1.014	0.019
70	1.009	0.018
71	1.001	0.021
72	0.988	0.020
73	0.982	0.019
74	0.974	0.019
75	0.964	0.021
76	0.953	0.021
77	0.947	0.021
78	0.942	0.023
79	0.939	0.029
80	0.940	0.020
81	0.950	0.035
82	0.965	0.039
83	0.960	0.042
84	-----	-----
85	0.884	0.030
86	0.883	0.033
87	0.884	0.032
88	0.888	0.032
89	0.884	0.032
AVG	1.056	0.024
TARE	0.952	0.022

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.054	0.036
1	0.054	0.031
2	0.053	0.032
3	0.053	0.031
4	0.054	0.029
5	0.056	0.035
6	0.058	0.032
7	0.058	0.029
8	0.057	0.030
9	0.056	0.029
10	0.054	0.030
11	0.056	0.029
12	0.058	0.032
13	0.065	0.033
14	0.059	0.027
15	0.061	0.031
16	0.056	0.032
17	0.061	0.029
18	0.059	0.029
19	0.057	0.028
20	0.056	0.030
21	0.061	0.032
22	0.059	0.032
23	0.055	0.030
24	0.056	0.030
25	0.060	0.030
26	0.057	0.034
27	0.058	0.032
28	0.055	0.029
29	0.058	0.029
30	0.061	0.030
31	0.059	0.032
32	0.053	0.032
33	0.055	0.032
34	0.054	0.033
35	0.051	0.030
36	0.051	0.032
37	0.051	0.036
38	0.048	0.035
39	0.042	0.036
40	0.042	0.034
41	0.038	0.038
42	0.027	0.037
43	0.022	0.039
44	0.016	0.041
45	0.014	0.043
46	0.004	0.040
47	0.008	0.041
48	0.010	0.043
49	0.015	0.041
50	0.013	0.039
51	0.018	0.032
52	0.017	0.034
53	0.020	0.036
54	0.026	0.034
55	0.024	0.037
56	0.028	0.032
57	0.028	0.032
58	0.028	0.033
59	0.028	0.028
60	0.034	0.033
61	0.031	0.030
62	0.036	0.033
63	0.031	0.030
64	0.037	0.034
65	0.038	0.033
66	0.039	0.031
67	0.042	0.028
68	0.039	0.039
69	0.042	0.030
70	0.042	0.034
71	0.040	0.032
72	0.044	0.034
73	0.043	0.031
74	0.044	0.035
75	0.042	0.029
76	0.043	0.029
77	0.050	0.032
78	0.042	0.029
79	0.048	0.031
80	0.045	0.029
81	0.042	0.032
82	0.054	0.029
83	0.049	0.035
84	0.040	0.028
85	0.050	0.029
86	0.052	0.033
87	0.057	0.029
88	0.054	0.032
89	0.053	0.031
AVG	0.044	0.023
TARE	0.080	0.041

Table B9 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

PROBE COORDINATES: X 0.21 R Y 0.80 R Z 0.00 R

0-Degree

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.965	0.016
1	0.968	0.019
2	0.974	0.022
3	0.985	0.024
4	0.996	0.026
5	1.012	0.024
6	1.026	0.024
7	1.039	0.022
8	1.047	0.022
9	1.059	0.020
10	1.060	0.020
11	1.072	0.020
12	1.082	0.018
13	1.088	0.020
14	1.090	0.018
15	1.095	0.019
16	1.099	0.018
17	1.104	0.018
18	1.106	0.019
19	1.109	0.019
20	1.107	0.019
21	1.114	0.019
22	1.115	0.019
23	1.118	0.017
24	1.119	0.019
25	1.122	0.016
26	1.118	0.019
27	1.117	0.015
28	1.115	0.019
29	1.116	0.018
30	1.117	0.016
31	1.118	0.018
32	1.117	0.016
33	1.116	0.017
34	1.119	0.015
35	1.123	0.017
36	1.123	0.017
37	1.117	0.017
38	1.117	0.016
39	1.118	0.017
40	1.119	0.014
41	1.119	0.016
42	1.119	0.015
43	1.117	0.016
44	1.114	0.017
45	1.108	0.015
46	1.109	0.017
47	1.109	0.015
48	1.109	0.015
49	1.108	0.017
50	1.112	0.017
51	1.107	0.015
52	1.108	0.016
53	1.108	0.016
54	1.104	0.015
55	1.100	0.016
56	1.100	0.016
57	1.090	0.015
58	1.093	0.018
59	1.092	0.016
60	1.092	0.015
61	1.089	0.015
62	1.090	0.014
63	1.089	0.016
64	1.087	0.017
65	1.080	0.015
66	1.075	0.014
67	1.075	0.016
68	1.073	0.015
69	1.067	0.015
70	1.063	0.016
71	1.061	0.014
72	1.061	0.015
73	1.056	0.014
74	1.049	0.014
75	1.040	0.014
76	1.045	0.014
77	1.038	0.014
78	1.035	0.015
79	1.031	0.016
80	1.024	0.014
81	1.022	0.013
82	1.018	0.017
83	1.011	0.015
84	1.003	0.014
85	0.995	0.014
86	0.987	0.014
87	[illegible]	0.013
88	0.979	0.015
89	[illegible]	0.015
AVG	1.075	0.017
TARE	0.968	0.026

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	-0.015	0.030
1	-0.020	0.025
2	-0.027	0.032
3	-0.034	0.028
4	-0.038	0.020
5	-0.038	0.030
6	-0.043	0.029
7	-0.042	0.028
8	-0.041	0.028
9	-0.041	0.027
10	-0.040	0.028
11	-0.038	0.026
12	-0.041	0.023
13	-0.036	0.029
14	-0.035	0.027
15	-0.034	0.025
16	-0.031	0.027
17	-0.026	0.029
18	-0.032	0.026
19	-0.027	0.032
20	-0.026	0.029
21	-0.024	0.027
22	-0.024	0.029
23	-0.025	0.026
24	-0.026	0.526
25	-0.023	0.024
26	-0.017	0.027
27	-0.021	0.023
28	-0.017	0.029
29	-0.017	0.027
30	-0.016	0.026
31	-0.013	0.027
32	-0.019	0.024
33	-0.013	0.029
34	-0.012	0.028
35	-0.012	0.026
36	-0.011	0.029
37	-0.014	0.027
38	-0.010	0.026
39	-0.009	0.028
40	-0.009	0.026
41	-0.009	0.026
42	-0.006	0.028
43	-0.008	0.024
44	-0.005	0.025
45	-0.004	0.025
46	-0.004	0.030
47	-0.001	0.030
48	-0.001	0.026
49	0.000	0.029
50	0.001	0.027
51	-0.001	0.026
52	0.002	0.025
53	0.002	0.023
54	0.006	0.029
55	0.003	0.023
56	0.005	0.027
57	0.006	0.023
58	0.007	0.025
59	0.008	0.026
60	0.006	0.029
61	0.011	0.027
62	0.010	0.027
63	0.010	0.027
64	0.011	0.027
65	0.010	0.027
66	0.007	0.026
67	0.007	0.027
68	0.006	0.025
69	0.010	0.025
70	0.007	0.026
71	0.012	[illegible]
72	0.014	0.027
73	0.012	0.025
74	0.012	[illegible]
75	0.014	[illegible]
76	0.013	[illegible]
77	0.011	0.027
78	0.012	[illegible]
79	0.009	0.027
80	0.010	[illegible]
81	0.011	[illegible]
82	0.011	[illegible]
83	[illegible]	[illegible]
84	[illegible]	[illegible]
85	[illegible]	0.026
86	[illegible]	[illegible]
87	0.003	0.024
88	[illegible]	[illegible]
89	[illegible]	[illegible]
AVG	-0.005	[illegible]
TARE	0.068	0.048

Table B10 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

0-Degree

PROBE COORDINATES: X 0.21 R Y 0.90 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.997	0.015
1	0.995	0.019
2	0.996	0.019
3	0.992	0.021
4	0.991	0.022
5	0.991	0.020
6	0.999	0.019
7	1.007	0.021
8	1.011	0.024
9	1.020	0.024
10	1.027	0.024
11	1.033	0.021
12	1.040	0.020
13	1.049	0.020
14	1.053	0.019
15	1.054	0.023
16	1.060	0.021
17	1.063	0.021
18	1.066	0.021
19	1.069	0.017
20	1.072	0.020
21	1.076	0.020
22	1.075	0.018
23	1.083	0.022
24	1.083	0.020
25	1.085	0.021
26	1.089	0.019
27	1.085	0.021
28	1.088	0.019
29	1.091	0.020
30	1.090	0.019
31	1.093	0.019
32	1.092	0.019
33	1.093	0.020
34	1.090	0.019
35	1.090	0.019
36	1.091	0.017
37	1.090	0.019
38	1.091	0.019
39	1.094	0.020
40	1.093	0.020
41	1.096	0.021
42	1.096	0.020
43	1.092	0.020
44	1.095	0.018
45	1.093	0.018
46	1.098	0.020
47	1.084	0.018
48	1.088	0.020
49	1.088	0.018
50	1.090	0.019
51	1.066	0.018
52	1.088	0.019
53	1.087	0.017
54	1.087	0.018
55	1.087	0.020
56	1.093	0.017
57	1.081	0.019
58	1.081	0.020
59	1.079	0.019
60	1.075	0.018
61	1.072	0.017
62	1.073	0.018
63	1.069	0.017
64	1.072	0.018
65	1.069	0.019
66	1.065	0.017
67	1.060	0.019
68	1.050	0.019
69	1.059	0.017
70	1.056	0.017
71	1.054	0.020
72	1.053	0.017
73	1.050	0.019
74	1.052	0.018
75	1.044	0.019
76	1.044	0.017
77	1.041	0.019
78	1.036	0.017
79	1.030	0.015
80	1.024	0.016
81	1.022	0.017
82	1.022	0.019
83	1.022	0.017
84	1.017	0.019
85	1.012	0.017
86	1.006	0.017
87	1.005	0.019
88	1.005	0.016
89	1.001	0.019
AVG	1.059	0.019
TARE	0.978	0.021

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	-0.019	0.033
1	-0.020	0.035
2	-0.022	0.035
3	-0.025	0.039
4	-0.025	0.037
5	-0.028	0.043
6	-0.034	0.036
7	-0.041	0.041
8	-0.046	0.038
9	-0.041	0.039
10	-0.053	0.036
11	-0.054	0.037
12	-0.057	0.036
13	-0.061	0.030
14	-0.058	0.030
15	-0.055	0.036
16	-0.055	0.034
17	-0.061	0.033
18	-0.059	0.032
19	-0.050	0.035
20	-0.055	0.033
21	-0.056	0.034
22	-0.060	0.034
23	-0.053	0.035
24	-0.054	0.031
25	-0.052	0.035
26	-0.049	0.030
27	-0.051	0.033
28	-0.048	0.036
29	-0.049	0.031
30	-0.045	0.039
31	-0.042	0.036
32	-0.049	0.028
33	-0.044	0.031
34	-0.042	0.035
35	-0.046	0.033
36	-0.044	0.034
37	-0.044	0.033
38	-0.042	0.033
39	-0.040	0.036
40	-0.037	0.030
41	-0.040	0.033
42	-0.041	0.029
43	-0.039	0.029
44	-0.042	0.030
45	-0.030	0.034
46	-0.031	0.031
47	-0.033	0.033
48	-0.030	0.034
49	-0.033	0.032
50	-0.029	0.033
51	-0.027	0.032
52	-0.031	0.033
53	-0.026	0.033
54	-0.025	0.032
55	-0.023	0.033
56	-0.024	0.032
57	-0.020	0.032
58	-0.021	0.030
59	-0.019	0.029
60	-0.016	0.033
61	-0.016	0.030
62	-0.020	0.030
63	-0.021	0.020
64	-0.017	0.039
65	-0.014	0.033
66	-0.016	0.033
67	-0.014	0.036
68	-0.012	0.035
69	-0.018	0.020
70	-0.011	0.034
71	-0.013	0.032
72	-0.009	0.031
73	-0.010	0.033
74	-0.005	0.037
75	-0.010	0.026
76	-0.005	0.031
77	-0.004	0.035
78	-0.008	0.036
79	-0.007	0.034
80	-0.003	0.033
81	-0.003	0.033
82	-0.004	0.033
83	-0.007	0.031
84	-0.012	0.029
85	-0.005	0.034
86	-0.007	0.036
87	-0.009	0.032
88	-0.010	0.031
89	-0.019	0.031
AVG	-0.031	0.033
TARE	0.057	0.039

Table B11 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

PROBE COORDINATES: X -0.39 R Y 0.70 R Z 0.00 R

LONGITUDINAL COMPONENT

90-Degree

DEGREE	AVG VEL	RMS
0	1.226	0.120
1	1.256	0.118
2	1.252	0.107
3	1.256	0.109
4	1.257	0.092
5	1.267	0.087
6	1.249	0.088
7	1.250	0.095
8	1.260	0.057
9	1.240	0.059
10	1.244	0.057
11	1.242	0.054
12	1.232	0.059
13	1.240	0.050
14	1.239	0.052
15	1.227	0.059
16	1.233	0.054
17	1.237	0.055
18	1.231	0.061
19	1.218	0.059
20	1.213	0.050
21	1.226	0.057
22	1.214	0.046
23	1.219	0.043
24	1.206	0.036
25	1.216	0.041
26	1.204	0.034
27	1.212	0.057
28	1.205	0.049
29	1.194	0.038
30	1.193	0.045
31	1.192	0.030
32	1.189	0.040
33	1.183	0.033
34	1.181	0.033
35	1.179	0.034
36	1.175	0.043
37	1.185	0.037
38	1.172	0.028
39	1.171	0.037
40	1.168	0.037
41	1.166	0.035
42	1.173	0.039
43	1.171	0.049
44	1.167	0.038
45	1.164	0.034
46	1.154	0.034
47	1.163	0.029
48	1.160	0.042
49	1.159	0.033
50	1.167	0.039
51	1.157	0.031
52	1.153	0.044
53	1.150	0.053
54	1.160	0.040
55	1.150	0.038
56	1.159	0.032
57	1.154	0.049
58	1.157	0.043
59	1.164	0.043
60	1.157	0.050
61	1.170	0.051
62	1.158	0.052
63	1.161	0.062
64	1.154	0.059
65	1.155	0.065
66	1.155	0.062
67	1.154	0.053
68	1.153	0.060
69	1.168	0.034
70	1.173	0.036
71	1.177	0.043
72	1.186	0.040
73	1.183	0.044
74	1.150	0.041
75	1.190	0.044
76	1.195	0.043
77	1.184	0.053
78	1.199	0.055
79	1.204	0.062
80	1.202	0.073
81	1.205	0.062
82	1.225	0.056
83	1.235	0.062
84	1.243	0.066
85	1.278	0.075
86	1.223	0.084
87	1.212	0.085
88	1.203	0.109
89	1.182	0.102
AVG	1.196	0.054
TARE	0.999	0.027

Table B12 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

PROBE COORDINATES: X -0.39 R Y 0.00 R Z 0.00 R

LONGITUDINAL COMPONENT

90-Degree

DEGREE	AVG VEL	RMS
0	1.172	0.089
1	1.206	0.104
2	1.202	0.102
3	1.234	0.097
4	1.240	0.111
5	1.260	0.071
6	1.247	0.087
7	1.289	0.073
8	1.286	0.056
9	1.319	0.066
10	1.310	0.059
11	1.333	0.062
12	1.360	0.082
13	1.353	0.061
14	1.337	0.071
15	1.335	0.057
16	1.317	0.049
17	1.307	0.055
18	1.306	0.064
19	1.286	0.051
20	1.266	0.050
21	1.264	0.038
22	1.234	0.051
23	1.233	0.041
24	1.219	0.039
25	1.203	0.037
26	1.191	0.035
27	1.195	0.042
28	1.196	0.047
29	1.184	0.044
30	1.176	0.029
31	1.170	0.036
32	1.162	0.038
33	1.149	0.034
34	1.157	0.033
35	1.146	0.030
36	1.157	0.028
37	1.146	0.022
38	1.143	0.031
39	1.144	0.029
40	1.143	0.036
41	1.136	0.032
42	1.140	0.036
43	1.133	0.043
44	1.149	0.055
45	1.136	0.037
46	1.129	0.030
47	1.140	0.041
48	1.120	0.029
49	1.133	0.034
50	1.130	0.042
51	1.136	0.042
52	1.127	0.031
53	1.141	0.028
54	1.123	0.026
55	1.120	0.031
56	1.131	0.027
57	1.149	0.073
58	1.138	0.030
59	1.128	0.033
60	1.142	0.046
61	1.133	0.049
62	1.152	0.055
63	1.147	0.055
64	1.140	0.045
65	1.135	0.020
66	1.130	0.046
67	1.126	0.020
68	1.144	0.046
69	1.143	0.039
70	1.142	0.039
71	-----	-----
72	1.129	0.035
73	1.144	0.023
74	1.141	0.037
75	1.140	0.025
76	1.149	0.036
77	1.141	0.037
78	1.154	0.036
79	1.151	0.033
80	1.157	0.034
81	1.160	0.035
82	1.162	0.027
83	1.152	0.030
84	1.154	0.032
85	1.161	0.045
86	1.157	0.935
87	1.164	0.049
88	1.153	0.056
89	1.154	0.036
AVG	1.184	0.246
TARE	0.998	0.025

Table B13 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of 20 Degrees

180-Degree

Table B14 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

PROBE COORDINATES: X -0.43 R Y 0.70 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL.
0	0.993
1	1.004
2	1.061
3	1.092
4	1.135
5	1.102
6	1.225
7	1.256
8	1.267
9	1.290
10	1.295
11	1.300
12	1.313
13	1.302
14	1.295
15	1.293
16	1.205
17	1.274
18	1.271
19	1.253
20	1.248
21	1.233
22	1.232
23	1.222
24	1.212
25	1.206
26	1.197
27	1.191
28	1.181
29	1.175
30	1.169
31	1.158
32	1.162
33	1.156
34	1.150
35	1.143
36	1.144
37	1.140
38	1.131
39	1.125
40	1.123
41	1.126
42	1.120
43	1.118
44	1.120
45	1.116
46	1.111
47	1.111
48	1.105
49	1.102
50	1.101
51	1.101
52	1.104
53	1.101
54	1.099
55	1.095
56	1.099
57	1.099
58	1.093
59	1.090
60	1.000
61	1.098
62	1.091
63	1.091
64	1.088
65	1.089
66	1.088
67	1.087
68	1.084
69	1.080
70	1.090
71	1.091
72	1.091
73	1.089
74	1.089
75	1.088
76	1.093
77	1.092
78	1.095
79	1.096
80	1.090
81	1.095
82	1.095
83	1.076
84	1.099
85	1.099
86	1.082
87	1.049
88	1.014
89	0.977
AVG	1.140

RADIAL COMPONENT

DEGREE	AVG VEL.
0	-0.457
1	-0.479
2	-0.487
3	-0.494
4	-0.449
5	-0.370
6	-0.208
7	-0.251
8	-0.237
9	-0.224
10	-0.234
11	-0.227
12	-0.218
13	-0.201
14	-0.180
15	-0.164
16	-0.155
17	-0.129
18	-0.114
19	-0.090
20	-0.078
21	-0.075
22	-0.063
23	-0.062
24	-0.053
25	-0.062
26	-0.067
27	-0.069
28	-0.070
29	-0.081
30	-0.086
31	-0.091
32	-0.088
33	-0.098
34	-0.109
35	-0.113
36	-0.116
37	-0.121
38	-0.125
39	-0.140
40	-0.147
41	-0.153
42	-0.158
43	-0.159
44	-0.163
45	-0.168
46	-0.176
47	-0.181
48	-0.187
49	-0.189
50	-0.197
51	-0.200
52	-0.206
53	-0.217
54	-0.220
55	-0.227
56	-0.228
57	-0.237
58	-0.240
59	-0.245
60	-0.249
61	-0.250
62	-0.260
63	-0.268
64	-0.272
65	-0.274
66	-0.282
67	-0.288
68	-0.295
69	-0.303
70	-0.306
71	-0.313
72	-0.319
73	-0.326
74	-0.334
75	-0.340
76	-0.353
77	-0.358
78	-0.371
79	-0.377
80	-0.391
81	-0.396
82	-0.403
83	-0.410
84	-0.422
85	-0.430
86	-0.442
87	-0.444
88	-0.441
89	-0.437
AVG	-0.233

	X	Y	Z
PROBE COORDINATES:	-0.43 R	0.70 R	0.00 R

0-Degree

LONGITUDINAL COMPONENT

DEGREE	AVG VEL
0	1.222
1	1.222
2	1.251
3	1.250
4	1.308
5	1.348
6	1.386
7	1.308
8	1.407
9	1.417
10	1.427
11	1.429
12	1.433
13	1.435
14	1.436
15	1.439
16	1.436
17	1.437
18	1.440
19	1.441
20	1.441
21	1.443
22	1.444
23	1.443
24	1.444
25	1.443
26	1.447
27	1.449
28	1.444
29	1.444
30	1.443
31	1.444
32	1.443
33	1.436
34	1.435
35	1.429
36	1.426
37	1.422
38	1.418
39	1.415
40	1.409
41	1.402
42	1.394
43	1.388
44	1.378
45	1.375
46	1.365
47	1.376
48	1.351
49	1.346
50	1.339
51	1.329
52	1.327
53	1.323
54	1.317
55	1.309
56	1.303
57	1.304
58	1.303
59	1.293
60	1.290
61	1.286
62	1.281
63	1.283
64	1.280
65	1.280
66	1.279
67	1.276
68	1.270
69	1.276
70	1.276
71	1.277
72	1.278
73	1.281
74	1.282
75	1.284
76	1.285
77	1.291
78	1.292
79	1.297
80	1.301
81	1.307
82	1.315
83	1.323
84	1.331
85	1.332
86	1.314
87	1.307
88	1.267
89	1.234
AVG	1.355

RADIAL COMPONENT

DEGREE	AVG VEL
0	0.001
1	-0.022
2	-0.063
3	-0.107
4	-0.137
5	-0.166
6	-0.179
7	-0.185
8	-0.195
9	-0.197
10	-0.208
11	-0.207
12	-0.208
13	-0.213
14	-0.208
15	-0.203
16	-0.212
17	-0.213
18	-0.213
19	-0.218
20	-0.223
21	-0.222
22	-0.221
23	-0.227
24	-0.225
25	-0.228
26	-0.229
27	-0.238
28	-0.252
29	-0.258
30	-0.261
31	-0.270
32	-0.275
33	-0.289
34	-0.293
35	-0.304
36	-0.313
37	-0.308
38	-0.312
39	-0.320
40	-0.324
41	-0.334
42	-0.338
43	-0.340
44	-0.342
45	-0.335
46	-0.342
47	-----
48	-0.333
49	-0.337
50	-0.334
51	-0.332
52	-0.331
53	-0.322
54	-0.322
55	-0.319
56	-0.317
57	-0.313
58	-0.302
59	-0.298
60	-0.294
61	-0.285
62	-0.285
63	-0.275
64	-0.271
65	-0.267
66	-0.259
67	-0.255
68	-0.242
69	-0.239
70	-0.234
71	-0.223
72	-0.220
73	-0.213
74	-0.203
75	-0.196
76	-0.190
77	-0.183
78	-0.176
79	-0.169
80	-0.160
81	-0.144
82	-0.137
83	-0.110
84	-0.089
85	-0.034
86	-0.017
87	0.026
88	0.040
89	0.025
AVG	-0.226

Table B15 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

180-Degree

Table B16 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

PROBE COORDINATES:	X	Y	Z
	0.21 R	0.70 R	0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL
0	0.929
1	0.945
2	0.970
3	0.982
4	0.997
5	1.008
6	1.013
7	1.022
8	1.033
9	1.041
10	1.047
11	1.051
12	1.057
13	1.063
14	1.064
15	1.071
16	1.074
17	1.077
18	1.083
19	1.080
20	1.090
21	1.093
22	1.094
23	1.096
24	1.098
25	1.101
26	1.101
27	1.108
28	1.103
29	1.111
30	1.112
31	1.112
32	1.112
33	1.117
34	1.116
35	1.118
36	1.119
37	1.119
38	1.120
39	1.120
40	1.122
41	1.117
42	1.118
43	1.114
44	1.122
45	1.121
46	1.126
47	1.121
48	1.122
49	1.124
50	1.125
51	1.123
52	1.125
53	1.125
54	1.125
55	1.125
56	1.128
57	1.129
58	1.127
59	1.128
60	1.127
61	1.127
62	1.125
63	1.123
64	1.118
65	1.114
66	1.120
67	1.118
68	1.110
69	1.101
70	-----
71	-----
72	1.101
73	1.101
74	1.103
75	1.095
76	1.100
77	1.101
78	1.102
79	1.108
80	1.104
81	1.093
82	1.118
83	1.095
84	1.105
85	1.105
86	1.099
87	1.080
88	1.040
89	0.960
AVG	1.091

RADIAL COMPONENT

DEGREE	AVG VEL
0	-0.241
1	-0.274
2	-0.288
3	-0.299
4	-0.300
5	-0.296
6	-0.300
7	-0.301
8	-0.288
9	-0.295
10	-0.296
11	-0.291
12	-0.289
13	-0.286
14	-0.288
15	-0.287
16	-0.279
17	-0.282
18	-0.277
19	-0.284
20	-0.281
21	-0.277
22	-0.277
23	-0.280
24	-0.274
25	-0.270
26	-0.268
27	-0.272
28	-0.272
29	-0.267
30	-0.258
31	-0.267
32	-0.268
33	-0.261
34	-0.270
35	-0.256
36	-0.254
37	-0.264
38	-0.257
39	-0.257
40	-0.261
41	-0.257
42	-0.256
43	-0.253
44	-0.255
45	-0.253
46	-0.247
47	-0.251
48	-0.249
49	-0.253
50	-0.254
51	-0.254
52	-0.244
53	-0.254
54	-0.248
55	-0.252
56	-0.252
57	-0.253
58	-0.256
59	-0.248
60	-0.250
61	-0.250
62	-0.256
63	-0.240
64	-0.249
65	-0.250
66	-0.253
67	-0.244
68	-0.245
69	-0.238
70	---
71	---
72	-0.241
73	-0.240
74	-0.243
75	-0.244
76	-0.243
77	-0.249
78	-0.252
79	-0.250
80	-0.255
81	-0.251
82	-0.256
83	-0.260
84	-0.265
85	-0.262
86	-0.263
87	-0.272
88	-0.265
89	-0.240
AVG	-0.260

	X	Y	Z
PROBE COORDINATES:	-0.39 R	0.50 R	0.00 R

180-Degree

Table B17 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

LONGITUDINAL COMPONENT

DEGREE	AVG VEL
0	1.030
1	1.040
2	1.038
3	1.057
4	1.069
5	1.094
6	1.113
7	1.122
8	1.132
9	1.140
10	1.137
11	1.142
12	1.122
13	1.117
14	1.080
15	1.085
16	1.069
17	1.062
18	1.051
19	1.049
20	1.054
21	1.081
22	1.051
23	1.051
24	1.054
25	-----
26	-----
27	-----
28	-----
29	-----
30	-----
31	-----
32	1.062
33	1.067
34	1.060
35	1.959
36	1.061
37	1.060
38	1.056
39	1.055
40	1.056
41	1.056
42	1.048
43	1.055
44	1.048
45	1.051
46	1.051
47	1.049
48	1.046
49	1.041
50	1.045
51	1.044
52	1.039
53	1.040
54	-----
55	-----
56	-----
57	1.046
58	1.045
59	1.043
60	1.045
61	1.042
62	1.042
63	1.037
64	-----
65	-----
66	1.041
67	1.044
68	-----
69	1.040
70	1.038
71	1.039
72	1.039
73	1.042
74	1.044
75	1.042
76	1.041
77	1.043
78	1.041
79	1.044
80	1.046
81	1.039
82	-----
83	1.041
84	1.008
85	1.034
86	1.039
87	1.035
88	1.033
89	1.037
AVG	1.059

RADIAL COMPONENT

DEGREE	AVG VEL
0	0.026
1	0.036
2	0.037
3	0.036
4	0.037
5	0.040
6	0.030
7	0.029
8	0.019
9	0.001
10	-0.004
11	-0.041
12	-0.065
13	-0.090
14	-0.177
15	-0.191
16	-0.229
17	-0.255
18	-0.267
19	-0.200
20	-0.273
21	-----
22	-0.279
23	-0.279
24	-0.278
25	-----
26	-----
27	-----
28	-----
29	-----
30	-----
31	-----
32	-0.243
33	-0.241
34	-0.244
35	-0.234
36	-0.226
37	-0.227
38	-0.225
39	-0.219
40	-0.220
41	-0.216
42	-0.216
43	-0.211
44	-0.208
45	-0.200
46	-0.198
47	-0.200
48	-0.195
49	-0.195
50	-0.189
51	-0.104
52	-0.186
53	-0.180
54	-----
55	-----
56	-0.345
57	-0.162
58	-0.160
59	-0.156
60	-0.151
61	-0.147
62	-0.141
63	-0.139
64	-0.170
65	-0.171
66	-0.129
67	-0.117
68	-0.161
69	-0.107
70	-0.106
71	-0.047
72	-0.099
73	-0.095
74	-0.083
75	-0.074
76	-0.074
77	-0.065
78	-0.057
79	-0.053
80	-0.041
81	-0.035
82	-0.078
83	-0.022
84	-----
85	-0.012
86	-0.000
87	0.005
88	0.013
89	0.021
AVG	-0.170

180-Degree

PROBE COORDINATES: X -0.39 R Y 0.00 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL
0	1.235
1	1.257
2	1.278
3	1.288
4	1.289
5	1.295
6	1.294
7	1.291
8	1.283
9	1.277
10	1.270
11	1.267
12	1.265
13	1.260
14	1.256
15	1.252
16	1.247
17	1.243
18	1.241
19	1.237
20	1.237
21	1.231
22	1.232
23	1.229
24	1.225
25	1.224
26	1.221
27	1.216
28	1.216
29	1.211
30	1.211
31	1.213
32	1.208
33	1.207
34	1.204
35	1.203
36	1.200
37	1.200
38	1.197
39	1.198
40	1.192
41	1.197
42	1.194
43	1.194
44	1.192
45	1.194
46	1.186
47	1.191
48	1.193
49	1.192
50	1.194
51	1.193
52	1.194
53	1.196
54	1.197
55	1.197
56	1.198
57	1.201
58	1.201
59	1.203
60	1.208
61	1.211
62	1.210
63	1.212
64	1.210
65	1.216
66	1.216
67	1.217
68	-----
69	-----
70	-----
71	-----
72	-----
73	-----
74	1.246
75	1.253
76	1.262
77	1.266
78	1.275
79	1.283
80	1.291
81	1.296
82	1.306
83	1.297
84	1.265
85	1.246
86	1.214
87	1.233
88	1.259
89	1.210
AVG	1.231

RADIAL COMPONENT

DEGREE	AVG VEL
0	-0.343
1	-----
2	-----
3	-0.230
4	-0.206
5	-0.175
6	-0.166
7	-0.164
8	-0.171
9	-0.178
10	-0.182
11	-0.180
12	-0.177
13	-0.181
14	-0.187
15	-0.185
16	-0.189
17	-0.191
18	-0.191
19	-0.191
20	-0.193
21	-0.192
22	-0.194
23	-0.195
24	-0.193
25	-0.197
26	-0.200
27	-0.201
28	-0.198
29	-0.203
30	-0.204
31	-0.200
32	-0.205
33	-0.205
34	-0.203
35	-0.210
36	-0.212
37	-0.218
38	-0.211
39	-0.213
40	-0.217
41	-0.213
42	-0.215
43	-0.215
44	-0.221
45	-0.217
46	-0.219
47	-0.220
48	-0.216
49	-0.226
50	-0.226
51	-0.229
52	-0.235
53	-0.238
54	-0.233
55	-0.232
56	-0.236
57	-0.236
58	-0.243
59	-0.241
60	-0.244
61	-0.249
62	-0.246
63	-0.243
64	-0.259
65	-0.248
66	-0.249
67	-0.254
68	-----
69	-----
70	-----
71	-----
72	-----
73	-----
74	-0.260
75	-0.269
76	-0.270
77	-0.272
78	-0.274
79	-0.281
80	-0.288
81	-0.292
82	-0.290
83	-0.282
84	-0.273
85	-0.267
86	-0.264
87	-0.279
88	-0.317
89	-0.348
AVG	-0.231

Table B18 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

180-Degree

Table B19 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

	X	Y	Z
PROBE COORDINATES:	-0.39 R	0.90 R	0.00 R

LONGITUDINAL COMPONENT		RADIAL COMPONENT	
DEGREE	AVG VEL	DEGREE	AVG VEL
0	1.164	0	-0.403
1	1.226	1	-0.342
2	1.252	2	-0.285
3	1.270	3	-0.218
4	1.281	4	-0.185
5	1.285	5	-0.169
6	1.285	6	-0.162
7	1.279	7	-0.161
8	1.274	8	-0.165
9	1.272	9	-0.162
10	1.268	10	-0.166
11	1.267	11	-0.162
12	1.265	12	-0.167
13	1.260	13	-0.163
14	1.259	14	-0.170
15	1.255	15	-0.169
16	1.251	16	-0.169
17	1.246	17	-0.175
18	1.246	18	-0.169
19	1.241	19	-0.168
20	1.240	20	-0.168
21	1.236	21	-0.168
22	1.230	22	-0.174
23	1.230	23	-0.175
24	1.225	24	-0.178
25	1.224	25	-0.171
26	1.217	26	-0.177
27	1.212	27	-0.178
28	1.209	28	-0.177
29	1.208	29	-0.180
30	1.207	30	-0.179
31	1.204	31	-0.179
32	1.201	32	-0.184
33	1.198	33	-0.185
34	1.195	34	-0.184
35	1.191	35	-0.191
36	1.188	36	-0.190
37	1.188	37	-0.193
38	1.186	38	-0.196
39	1.183	39	-0.194
40	1.177	40	-0.204
41	1.175	41	-0.205
42	1.175	42	-0.211
43	1.177	43	-0.209
44	1.171	44	-0.214
45	1.170	45	-0.217
46	1.170	46	-0.221
47	1.172	47	-0.222
48	1.171	48	-0.228
49	1.171	49	-0.229
50	1.167	50	-0.235
51	1.167	51	-0.236
52	1.166	52	-0.241
53	1.165	53	-0.244
54	1.167	54	-0.246
55	1.165	55	-0.250
56	1.161	56	-0.251
57	1.163	57	-0.254
58	1.162	58	-0.262
59	1.165	59	-0.264
60	1.164	60	-0.269
61	1.156	61	-0.273
62	1.168	62	-0.272
63	1.168	63	-0.280
64	1.167	64	-0.288
65	1.170	65	-0.294
66	1.171	66	-0.295
67	1.173	67	-0.299
68	1.172	68	-0.302
69	1.174	69	-0.309
70	1.181	70	-0.313
71	1.183	71	-0.317
72	1.187	72	-0.324
73	1.191	73	-0.331
74	1.196	74	-0.334
75	1.201	75	-0.343
76	1.204	76	-0.347
77	1.211	77	-0.355
78	1.218	78	-0.364
79	1.224	79	-0.366
80	1.230	80	-0.370
81	1.232	81	-0.381
82	1.241	82	-0.385
83	1.249	83	-0.396
84	1.253	84	-0.394
85	1.234	85	-0.393
86	1.207	86	-0.391
87	1.153	87	-0.386
88	1.114	88	[illegible]
89	1.126	89	-0.390
AVG	1.205	AVG	-0.240

PROBE COORDINATES: X -0.39 R, Y 0.50 R, Z 0.00 R

0-Degree

LONGITUDINAL COMPONENT DEGREE	AVG VEL	RADIAL COMPONENT DEGREE	AVG VEL
0	1.316	0	-0.151
1	1.336	1	-0.166
2	1.344	2	-0.175
3	1.345	3	-0.181
4	1.338	4	-0.184
5	1.332	5	-0.184
6	1.330	6	-0.189
7	1.326	7	-0.188
8	1.321	8	-0.190
9	1.315	9	-0.195
10	1.310	10	-0.197
11	1.307	11	-0.199
12	1.301	12	-0.199
13	1.299	13	-0.201
14	1.298	14	-0.202
15	1.291	15	-0.206
16	1.287	16	-0.209
17	1.288	17	-0.209
18	1.280	18	-0.212
19	1.277	19	-0.211
20	1.274	20	-0.216
21	1.269	21	-9.217
22	1.267	22	-0.219
23	1.263	23	-0.222
24	1.256	24	-0.223
25	1.253	25	-0.225
26	1.247	26	-0.227
27	1.246	27	-0.227
28	1.243	28	-0.231
29	1.237	29	-0.231
30	1.235	30	-0.233
31	1.235	31	-0.233
32	1.227	32	-0.239
33	1.223	33	-0.243
34	1.221	34	-0.243
35	1.219	35	-0.248
36	1.216	36	-0.249
37	1.212	37	-0.249
38	1.210	38	-0.251
39	1.207	39	-0.251
40	1.204	40	-0.253
41	1.200	41	-0.255
42	1.195	42	-0.256
43	1.192	43	-0.259
44	1.187	44	-0.262
45	1.183	45	-0.262
46	1.181	46	-0.265
47	1.181	47	-0.264
48	1.176	48	-0.265
49	1.175	49	-0.270
50	1.171	50	-0.273
51	1.169	51	-0.273
52	1.170	52	-0.273
53	1.166	53	-0.275
54	1.164	54	-0.277
55	1.162	55	-0.278
56	1.161	56	-0.283
57	1.159	57	-0.284
58	1.156	58	-0.285
59	1.156	59	-0.287
60	1.152	60	-0.294
61	1.151	61	-0.291
62	1.150	62	-0.295
63	1.148	63	-0.299
64	1.145	64	-0.301
65	1.146	65	-0.302
66	1.147	66	-0.307
67	1.145	67	-0.312
68	1.146	68	-0.315
69	1.145	69	-0.318
70	1.147	70	-0.322
71	1.142	71	-0.326
72	1.144	72	-0.330
73	1.143	73	-0.334
74	1.146	74	-0.340
75	1.149	75	-0.347
76	1.147	76	-0.346
77	1.152	77	-0.353
78	1.150	78	-0.362
79	1.156	79	-0.355
80	1.158	80	-0.357
81	1.166	81	-0.326
82	1.165	82	-----
83	1.164	83	-----
84	1.164	84	-----
85	1.123	85	-0.070
86	1.121	86	-0.056
87	1.152	87	-0.081
88	1.176	88	-0.094
89	1.259	89	-0.128
AVG	1.212	AVG	-0.247

Table B20 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

0-Degree

PROBE COORDINATES: X -0.35 R Y 0.00 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL
0	1.240
1	1.206
2	1.331
3	1.339
4	1.346
5	1.306
6	1.307
7	1.407
8	1.410
9	1.418
10	1.420
11	1.432
12	1.433
13	1.437
14	1.441
15	1.438
16	1.439
17	1.428
18	1.421
19	1.415
20	1.402
21	1.387
22	1.376
23	1.363
24	1.344
25	1.339
26	1.322
27	1.304
28	1.286
29	1.279
30	1.264
31	1.250
32	1.239
33	1.234
34	1.219
35	1.214
36	1.206
37	1.199
38	1.190
39	1.184
40	1.177
41	1.174
42	1.171
43	1.162
44	1.159
45	1.156
46	1.150
47	1.152
48	1.147
49	1.149
50	1.145
51	1.145
52	1.144
53	1.143
54	1.144
55	1.140
56	1.143
57	1.143
58	1.147
59	1.146
60	1.144
61	1.150
62	1.152
63	1.155
64	1.154
65	1.156
66	1.157
67	1.159
68	1.163
69	1.169
70	1.169
71	1.176
72	1.184
73	1.192
74	1.199
75	1.200
76	1.217
77	1.224
78	1.231
79	1.240
80	1.243
81	1.256
82	1.253
83	1.260
84	1.237
85	1.202
86	1.163
87	1.159
88	1.153
89	1.191
AVG	1.247

RADIAL COMPONENT

DEGREE	AVG VEL
0	-0.222
1	-0.205
2	-0.305
3	-0.319
4	-0.319
5	-0.335
6	-0.339
7	-0.339
8	-0.341
9	-0.350
10	-0.358
11	-0.375
12	-0.386
13	-0.405
14	-0.420
15	-0.439
16	-0.452
17	-0.464
18	-0.480
19	-0.500
20	-0.509
21	-0.525
22	-0.528
23	-0.539
24	-0.544
25	-0.542
26	-0.542
27	-0.542
28	-0.535
29	-0.531
30	-0.527
31	-0.522
32	-0.516
33	-0.508
34	-0.502
35	-0.496
36	-0.496
37	-0.479
38	-0.468
39	-0.462
40	-0.457
41	-0.446
42	-0.436
43	-0.434
44	-0.420
45	-0.417
46	-0.412
47	-0.406
48	-0.394
49	-0.384
50	-0.380
51	-0.373
52	-0.368
53	-0.358
54	-0.346
55	-0.343
56	-0.332
57	-0.325
58	-0.315
59	-0.315
60	-0.306
61	-0.293
62	-0.288
63	-0.277
64	-0.272
65	-0.260
66	-0.249
67	-0.246
68	-0.237
69	-0.224
70	-0.216
71	-0.207
72	-0.198
73	-0.183
74	-0.173
75	-0.163
76	-0.151
77	-0.141
78	-0.125
79	-0.125
80	-0.104
81	-0.096
82	-0.077
83	-0.063
84	-0.034
85	-0.049
86	-0.05[illegible]
87	-0.080
88	-0.126
89	-0.137
AVG	-0.340

Table B21 - Computer Output of Inclined Velocity Data
Resolved Along Shaft Coordinate System

0-Degree

PROBE COORDINATES: X 0.21 R Y 0.70 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL
0	0.855
1	0.854
2	0.991
3	1.046
4	1.010
5	1.015
6	1.068
7	1.061
8	0.976
9	1.028
10	1.068
11	1.070
12	1.071
13	1.070
14	1.072
15	1.074
16	1.072
17	1.070
18	1.074
19	1.075
20	1.075
21	1.074
22	1.076
23	1.075
24	1.070
25	1.070
26	1.073
27	1.066
28	1.070
29	1.072
30	1.074
31	1.072
32	1.068
33	1.069
34	1.066
35	1.068
36	1.067
37	1.064
38	1.062
39	1.059
40	1.059
41	1.059
42	1.053
43	1.044
44	1.043
45	1.039
46	1.036
47	1.035
48	1.035
49	1.036
50	1.034
51	1.030
52	1.026
53	1.024
54	1.024
55	1.019
56	1.021
57	1.010
58	1.015
59	1.011
60	1.009
61	1.003
62	0.999
63	0.995
64	0.983
65	0.983
66	0.979
67	0.980
68	0.975
69	0.967
70	0.963
71	0.954
72	0.944
73	0.930
74	0.930
75	0.921
76	0.911
77	0.907
78	0.899
79	0.889
80	0.899
81	0.907
82	0.925
83	0.945
84	-----
85	0.849
86	0.847
87	0.849
88	0.853
89	0.843
AVG	1.027

RADIAL COMPONENT

DEGREE	AVG VEL
0	-0.254
1	-0.253
2	-0.267
3	-0.325
4	-0.310
5	-0.309
6	-0.327
7	-0.324
8	-0.295
9	-0.315
10	-0.331
11	-0.330
12	-0.320
13	-0.321
14	-0.327
15	-0.326
16	-0.330
17	-0.328
18	-0.328
19	-0.330
20	-0.331
21	-0.326
22	-0.329
23	-0.333
24	-0.333
25	-0.328
26	-0.330
27	-0.327
28	-0.331
29	-0.329
30	-0.326
31	-0.327
32	-0.332
33	-0.331
34	-0.331
35	-0.334
36	-0.334
37	-0.333
38	-0.335
39	-0.340
40	-0.341
41	-0.345
42	-0.354
43	-0.356
44	-0.362
45	-0.363
46	-0.372
47	-0.368
48	-0.366
49	-0.361
50	-0.363
51	-0.355
52	-0.355
53	-0.352
54	-0.345
55	-0.345
56	-0.341
57	-0.341
58	-0.339
59	-0.330
60	-0.331
61	-0.332
62	-0.325
63	-0.329
64	-0.320
65	-0.317
66	-0.315
67	-0.312
68	-0.313
69	-0.308
70	-0.306
71	-0.305
72	-0.297
73	-0.296
74	-0.292
75	-0.290
76	-0.285
77	-0.277
78	-0.282
79	-0.276
80	-0.279
81	-0.286
82	-0.279
83	-0.292
84	-0.254
85	-0.255
86	-0.253
87	-0.262
88	-0.253
89	-0.253
AVG	-0.319

Table B22 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

Table B23 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

0-Degree

PROBE COORDINATES: X 0.21 R Y 0.00 R Z 0.00 R

LONGITUDINAL COMPONENT DEGREE	AVG VEL	RADIAL COMPONENT DEGREE	AVG VEL
0	0.902	0	-0.344
1	0.900	1	-0.357
2	0.906	2	-0.359
3	0.913	3	-0.369
4	0.923	4	-0.377
5	0.930	5	-0.381
6	0.950	6	-0.392
7	0.962	7	-0.395
8	0.970	8	-0.396
9	0.981	9	-0.401
10	0.990	10	-0.403
11	0.995	11	-0.402
12	1.003	12	-0.409
13	1.011	13	-0.406
14	1.013	14	-0.406
15	1.017	15	-0.407
16	1.022	16	-0.405
17	1.029	17	-0.402
18	1.028	18	-0.408
19	1.033	19	-0.404
20	1.031	20	-0.403
21	1.038	21	-0.404
22	1.040	22	-0.404
23	1.042	23	-0.405
24	1.042	24	-0.407
25	1.046	25	-0.406
26	1.044	26	-0.398
27	1.042	27	-0.401
28	1.042	28	-0.397
29	1.043	29	-0.398
30	1.044	30	-0.397
31	1.046	31	-0.395
32	1.044	32	-0.400
33	1.045	33	-0.394
34	1.047	34	-0.394
35	1.051	35	-0.395
36	1.051	36	-0.394
37	1.045	37	-0.395
38	1.047	38	-0.391
39	1.047	39	-0.391
40	1.049	40	-0.391
41	1.049	41	-0.391
42	1.050	42	-0.389
43	1.047	43	-0.389
44	1.045	44	-0.386
45	1.040	45	-0.383
46	1.040	46	-0.383
47	1.042	47	-0.380
48	1.042	48	-0.381
49	1.041	43	-0.379
50	1.045	50	-0.380
51	1.040	51	-0.379
52	1.042	52	-0.377
53	1.042	53	-0.377
54	1.040	54	-0.372
55	1.035	55	-0.373
56	1.035	56	-0.371
57	1.034	57	-0.370
58	1.029	58	-0.367
59	1.029	59	-0.366
60	1.028	60	-0.360
61	1.027	61	-0.362
62	1.027	62	-0.363
63	1.026	63	-0.363
64	1.025	64	-0.362
65	1.019	65	-0.360
66	1.013	66	-0.361
67	1.012	67	-0.361
68	1.010	68	-0.361
69	1.006	69	-0.355
70	1.002	70	-0.357
71	1.001	71	-0.352
72	1.001	72	-0.350
73	0.997	73	-0.350
74	0.990	74	-0.343
75	0.990	75	-0.345
76	0.987	76	-0.345
77	0.983	77	-0.345
78	0.977	78	-0.343
79	0.972	79	-0.344
80	0.966	80	-0.341
81	0.964	81	-0.339
82	0.960	82	-0.338
83	0.953	03	-0.338
04	0.945	84	-0.337
85	0.938	85	-0.335
86	0.930	86	-0.332
87	0.922	87	-0.333
83	0.910	83	-0.335
89	0.901	89	-0.337
AVG	1.007	AVG	-0.376

Table B24 - Computer Output of Inclined Velocity Data Resolved Along Shaft Coordinate System

0-Degree

PROBE COORDINATES: X 0.21 R   Y 0.90 R   Z 0.00 R

LONGITUDINAL COMPONENT DEGREE	AVG VEL	RADIAL COMPONENT DEGREE	AVG VEL
0	0.931	0	-0.359
1	0.928	1	-0.359
2	0.928	2	-0.362
3	0.924	3	-0.363
4	0.923	4	-0.362
5	0.922	5	-0.365
6	0.927	6	-0.374
7	0.932	7	-0.303
8	0.934	8	-0.389
9	0.944	9	-0.307
10	0.947	10	-0.401
11	0.952	11	-0.404
12	0.958	12	-0.409
13	0.965	13	-0.416
14	0.969	14	-0.415
15	0.971	15	-0.412
16	0.977	16	-0.414
17	0.978	17	-0.421
18	0.981	18	-0.420
19	0.905	19	-0.420
20	0.989	20	-0.418
21	0.992	21	-0.420
22	0.990	22	-0.424
23	1.000	23	-0.420
24	0.999	24	-0.421
25	1.002	25	-0.420
26	1.007	26	-0.419
27	1.002	27	-0.419
28	1.006	28	-0.417
29	1.009	29	-0.420
30	1.008	30	-0.415
31	1.012	31	-0.413
32	1.018	32	-0.420
33	1.012	33	-0.415
34	1.018	34	-0.413
35	1.008	35	-0.416
36	1.018	36	-0.414
37	1.018	37	-0.414
38	1.018	38	-0.413
39	1.014	39	-0.412
40	1.019	40	-0.418
41	1.017	41	-0.413
42	1.016	42	-0.413
43	1.013	43	-0.411
44	1.015	44	-0.414
45	1.017	45	-0.403
46	1.013	46	-0.402
47	1.008	47	-0.402
48	1.004	48	-0.398
49	1.011	49	-0.404
50	1.015	50	-0.400
51	1.011	51	-0.397
52	1.012	52	-0.401
53	1.012	53	-0.397
54	1.013	54	-0.395
55	1.013	55	-0.394
56	1.009	56	-0.393
57	1.009	57	-0.309
58	1.003	58	-0.389
59	1.007	59	-0.387
60	1.005	60	-0.383
61	1.002	61	-0.382
62	1.001	62	-0.386
63	0.997	63	-0.385
64	1.002	64	-0.383
65	1.000	65	-0.379
66	0.995	66	-0.379
67	0.991	67	-0.376
68	0.990	68	-0.373
69	0.909	69	-0.379
70	0.938	70	-0.371
71	0.986	71	-0.372
72	0.987	72	-0.369
73	0.983	73	-0.369
74	0.986	74	-0.366
75	0.970	75	-0.366
76	0.979	76	-0.362
77	0.977	77	-0.360
78	0.971	78	-0.361
79	0.966	79	-0.359
80	0.959	80	-0.357
81	0.960	81	-0.352
82	0.959	82	-0.354
83	0.953	83	-0.337
84	0.952	84	-0.359
85	0.950	85	-0.350
86	0.943	86	-0.351
87	0.942	87	-0.351
88	0.941	88	-0.353
89	0.934	89	-0.360
AVG	0.984	AVG	-0.391

Table B25 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X -0.39 R Y -0.50 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.162	0.034
1	1.178	0.079
2	1.193	0.082
3	1.214	0.071
4	1.232	0.076
5	1.235	0.073
6	1.251	0.063
7	1.252	0.064
8	1.249	0.065
9	1.257	0.057
10	1.261	0.052
11	1.261	0.040
12	1.258	0.049
13	1.261	0.029
14	1.260	0.030
15	1.257	0.030
16	1.264	0.030
17	1.250	0.030
18	1.254	0.032
19	1.256	0.029
20	1.255	0.029
21	1.255	0.032
22	1.249	0.030
23	1.249	0.027
24	1.249	0.029
25	1.246	0.033
26	1.245	0.029
27	1.240	0.030
28	1.242	0.029
29	1.241	0.031
30	1.236	0.027
31	1.229	0.029
32	1.229	0.031
33	1.232	0.030
34	1.221	0.030
35	1.225	0.031
36	1.221	0.026
37	1.221	0.027
38	1.223	0.028
39	1.220	0.028
40	1.222	0.031
41	1.218	0.028
42	1.216	0.027
43	1.214	0.030
44	1.212	0.025
45	1.214	0.030
46	1.212	0.030
47	1.208	0.029
48	1.204	0.030
49	1.204	0.029
50	1.202	0.032
51	1.201	0.030
52	1.202	0.029
53	1.198	0.028
54	1.197	0.030
55	1.196	0.032
56	1.195	0.027
57	1.193	0.023
58	1.180	0.025
59	1.192	0.030
60	1.188	0.026
61	1.187	0.032
62	1.189	0.030
63	1.190	0.030
64	1.185	0.033
65	1.183	0.029
66	1.186	0.030
67	1.183	0.030
68	1.185	0.030
69	1.189	0.033
70	1.186	0.030
71	1.196	0.030
72	1.183	0.032
73	1.185	0.031
74	1.186	0.031
75	1.187	0.027
76	1.184	0.031
77	1.186	0.033
78	1.196	0.033
79	1.193	0.033
80	1.190	0.034
81	1.203	0.033
82	1.199	0.036
83	1.205	0.042
84	1.206	0.039
85	1.213	0.045
86	1.205	0.047
87	1.204	0.050
88	1.197	0.066
89	1.188	0.075
AVG	1.215	0.037
TARE	1.004	0.016

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.164	0.027
1	0.171	0.028
2	0.175	0.027
3	0.179	0.031
4	0.192	0.028
5	0.200	0.032
6	0.203	0.028
7	0.209	0.036
8	0.214	0.049
9	0.216	0.048
10	0.214	0.062
11	0.204	0.084
12	0.218	0.084
13	0.194	0.099
14	0.202	0.087
15	0.203	0.081
16	0.201	0.080
17	0.204	0.083
18	-----	-----
19	-0.010	0.089
20	-0.013	0.070
21	-0.007	0.077
22	-0.012	0.066
23	-0.020	0.045
24	0.004	0.072
25	-0.002	0.054
26	-0.008	0.054
27	-0.012	0.027
28	-0.003	0.045
29	0.007	0.059
30	0.010	0.052
31	0.013	0.044
32	0.003	0.026
33	0.014	0.045
34	0.006	0.029
35	0.012	0.037
36	0.016	0.028
37	0.017	0.032
38	0.019	0.027
39	0.024	0.033
40	0.026	0.025
41	0.029	0.027
42	0.030	0.033
43	0.031	0.027
44	0.011	0.034
45	0.011	0.027
46	0.013	0.027
47	0.028	0.036
48	0.020	0.039
49	0.023	0.035
50	0.032	0.034
51	0.029	0.025
52	0.026	0.027
53	0.031	0.034
54	0.033	0.027
55	0.037	0.026
56	0.044	0.027
57	0.048	0.042
58	0.044	0.028
59	0.043	0.036
60	0.049	0.030
61	0.052	0.025
62	0.055	0.032
63	0.063	0.025
64	0.061	0.027
65	0.065	0.029
66	0.068	0.023
67	0.066	0.024
68	0.072	0.032
69	0.076	0.024
70	0.079	0.031
71	0.088	0.025
72	0.087	0.031
73	0.088	0.025
74	0.093	0.028
75	0.100	0.029
76	0.099	0.025
77	0.100	0.027
78	0.106	0.025
79	0.110	0.023
80	0.117	0.027
81	0.116	0.026
82	0.124	0.026
83	0.120	0.025
84	0.132	0.026
85	0.139	0.024
86	0.143	0.030
87	0.146	0.027
88	0.154	0.030
89	0.157	0.026
AVG	0.000	0.030
TARE	0.034	0.013

PROBE COORDINATES: X -0.39 R Y 0.78 R Z 0.00 R

LONGITUDINAL COMPONENT			VERTICAL COMPONENT		
DEGREE	AVG VEL	RMS	DEGREE	AVG VEL	RMS
0	1.249	0.028	0	0.083	0.054
1	1.249	0.031	1	0.084	0.044
2	1.244	0.027	2	0.082	0.052
3	1.241	0.031	3	0.076	0.042
4	1.241	0.030	4	0.078	0.043
5	1.238	0.029	5	0.087	0.051
6	1.241	0.031	6	0.082	0.044
7	1.238	0.029	7	0.075	0.045
8	1.243	0.032	8	0.077	0.053
9	1.240	0.028	9	0.078	0.045
10	1.238	0.026	10	0.076	0.043
11	1.240	0.032	11	0.075	0.046
12	1.235	0.031	12	0.077	0.054
13	1.234	0.027	13	0.078	0.054
14	1.237	0.029	14	0.064	0.051
15	1.237	0.028	15	0.074	0.050
16	1.234	0.031	16	0.075	0.042
17	1.237	0.029	17	0.070	0.047
18	1.233	0.026	18	0.073	0.052
19	1.239	0.030	19	0.070	0.055
20	1.234	0.033	20	0.065	0.043
21	1.242	0.029	21	0.067	0.046
22	1.237	0.027	22	0.059	0.042
23	1.241	0.031	23	0.064	0.047
24	1.240	0.028	24	0.062	0.049
25	1.240	0.027	25	0.065	0.053
26	1.241	0.030	26	0.062	0.049
27	1.244	0.030	27	0.061	0.049
28	1.241	0.036	28	0.063	0.043
29	1.247	0.031	29	0.061	0.049
30	1.248	0.032	30	0.051	0.045
31	1.252	0.033	31	0.057	0.051
32	1.257	0.032	32	0.061	0.050
33	1.261	0.034	33	-----	-----
34	1.263	0.033	34	0.039	0.045
35	1.265	0.034	35	0.049	0.045
36	1.273	0.039	36	0.049	0.043
37	1.278	0.042	37	0.048	0.042
38	1.290	0.045	38	0.049	0.052
39	1.292	0.052	39	0.049	0.047
40	1.312	0.059	40	0.059	0.054
41	1.315	0.075	41	0.055	0.047
42	1.322	0.074	42	0.058	0.053
43	1.312	0.074	43	0.057	0.056
44	1.301	0.084	44	0.066	0.083
45	1.277	0.092	45	0.052	0.099
46	1.271	0.100	46	0.045	0.122
47	1.261	0.117	47	0.025	0.107
48	1.256	0.124	48	0.033	0.103
49	1.252	0.126	49	0.053	0.091
50	1.260	0.120	50	0.052	0.079
51	1.276	0.137	51	0.059	0.058
52	1.315	0.099	52	0.069	0.052
53	1.328	0.085	53	0.066	0.045
54	1.337	0.073	54	0.069	0.044
55	1.341	0.050	55	0.076	0.046
56	1.340	0.043	56	0.073	0.047
57	1.339	0.035	57	0.067	0.041
58	1.334	0.033	58	0.073	0.038
59	1.323	0.031	59	0.081	0.045
60	1.320	0.031	60	0.072	0.036
61	1.316	0.033	61	0.076	0.041
62	1.324	0.033	62	0.080	0.047
63	1.316	0.034	63	0.075	0.042
64	1.312	0.035	64	0.080	0.046
65	1.308	0.032	65	0.077	0.045
66	1.308	0.037	66	0.079	0.038
67	1.304	0.030	67	0.077	0.042
68	1.300	0.031	68	0.085	0.053
69	1.296	0.028	69	0.076	0.047
70	1.291	0.029	70	0.079	0.041
71	1.293	0.031	71	0.077	0.046
72	1.287	0.032	72	0.074	0.053
73	1.268	0.029	73	0.076	0.044
74	1.280	0.027	74	0.085	0.042
75	1.260	0.032	75	0.084	0.052
76	1.274	0.030	76	0.085	0.043
77	1.275	0.028	77	0.079	0.043
78	1.271	0.030	78	0.080	0.047
79	1.269	0.070	79	0.087	0.047
80	1.265	0.030	80	0.077	0.044
81	1.264	0.028	81	0.084	0.045
82	1.264	0.033	82	0.082	0.042
83	1.262	0.030	83	0.085	0.044
84	1.257	0.031	84	0.080	0.043
85	1.252	0.031	85	0.099	0.050
86	1.250	0.028	86	0.090	0.054
87	1.253	0.030	87	0.087	0.042
88	1.249	0.029	88	0.084	0.041
89	1.249	0.031	89	0.079	0.049
AVG	1.272	0.042	AVG	0.078	0.051
TARE	1.001	0.013	TARE	0.026	0.013

Table B26 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES:	X	Y	Z
	-0.39 R	0.00 R	0.00 R

LONGITUDINAL COMPONENT / VERTICAL COMPONENT

LONGITUDINAL DEGREE	AVG VEL	RMS	VERTICAL DEGREE	AVG VEL	RMS
0	1.232	0.027	0	0.096	0.047
1	1.230	0.027	1	0.006	0.041
2	1.225	0.029	2	0.094	0.043
3	1.225	0.027	3	0.088	0.043
4	1.222	0.031	4	0.090	0.047
5	1.219	0.033	5	0.080	0.043
6	1.223	0.025	6	0.070	0.041
7	1.218	0.029	7	0.069	0.043
8	1.217	0.027	8	0.065	0.045
9	1.213	0.029	9	0.071	0.048
10	1.212	0.029	10	0.065	0.041
11	1.216	0.033	11	0.060	0.043
12	1.209	0.029	12	0.059	0.052
13	1.212	0.027	13	0.058	0.043
14	1.214	0.027	14	0.051	0.040
15	1.216	0.030	15	0.047	0.047
16	1.215	0.031	16	0.043	0.045
17	1.211	0.023	17	0.037	0.037
18	1.215	0.028	18	0.038	0.060
19	1.214	0.030	19	0.032	0.039
20	1.213	0.026	20	0.032	0.043
21	1.214	0.031	21	0.021	0.039
22	1.217	0.027	22	0.025	0.049
23	1.215	0.029	23	0.016	0.046
24	1.213	0.028	24	0.015	0.044
25	1.218	0.029	25	0.006	0.042
26	1.223	0.029	26	0.001	0.049
27	1.224	0.029	27	0.001	0.051
28	1.228	0.032	28	-0.001	0.048
29	1.227	0.029	29	-0.008	0.056
30	1.229	0.033	30	-0.010	0.050
31	1.231	0.033	31	-0.021	0.047
32	1.233	0.035	32	-0.030	0.044
33	1.239	0.034	33	-0.032	0.046
34	1.241	0.034	34	-0.038	0.047
35	1.243	0.032	35	-0.047	0.041
36	1.255	0.037	36	-0.053	0.046
37	1.262	0.040	37	-0.050	0.052
38	1.264	0.035	38	-0.059	0.043
39	1.274	0.041	39	-0.067	0.046
40	1.286	0.043	40	-0.072	0.050
41	1.294	0.052	41	-0.080	0.053
42	1.303	0.057	42	-0.080	0.051
43	1.298	0.052	43	-0.039	0.065
44	1.295	0.074	44	-0.094	0.083
45	1.267	0.086	45	-0.104	0.107
46	1.253	0.091	46	-0.126	0.125
47	1.210	0.117	47	-0.129	0.129
48	1.203	0.119	48	-0.094	0.138
49	1.183	0.129	49	-0.042	0.135
50	1.194	0.164	50	0.026	0.125
51	1.251	0.143	51	0.077	0.101
52	1.294	0.129	52	0.119	0.060
53	1.332	0.092	53	0.122	0.045
54	1.339	0.077	54	0.121	0.044
55	1.353	0.056	55	0.120	0.044
56	1.351	0.045	56	0.116	0.039
57	1.346	0.037	57	0.121	0.046
58	1.344	0.038	58	0.115	0.042
59	1.341	0.036	59	0.113	0.039
60	1.339	0.035	60	0.118	0.036
61	1.336	0.035	61	0.119	0.040
62	1.329	0.037	62	0.115	0.036
63	1.326	0.035	63	0.113	0.043
64	1.325	0.035	64	0.112	0.040
65	1.322	0.036	65	0.113	0.042
66	1.319	0.032	66	0.116	0.044
67	1.314	0.031	67	0.119	0.0[illegible]2
68	1.313	0.034	68	0.12[illegible]	0.052
69	1.312	0.037	69	0.116	0.041
70	1.304	0.036	70	0.115	0.035
71	1.299	0.034	71	0.114	0.038
72	1.299	0.035	72	0.122	0.043
73	1.293	0.034	73	0.119	0.043
74	1.289	0.035	74	0.114	0.039
75	1.284	0.030	75	0.10[illegible]	0.035
76	1.282	0.033	76	0.119	0.043
77	1.277	0.034	77	0.112	0.042
78	1.274	0.028	78	0.112	0.042
79	1.270	0.032	79	0.116	0.040
80	1.262	0.030	80	0.123	0.046
81	1.259	0.034	81	0.109	0.040
82	1.255	0.030	82	0.110	0.042
83	1.253	0.038	83	0.115	0.044
84	1.248	0.030	84	0.110	0.043
85	1.246	0.030	85	0.099	0.039
86	1.244	0.029	86	0.096	0.043
87	1.239	0.028	87	0.104	0.039
88	1.234	0.030	88	0.098	0.045
89	1.233	0.032	89	0.095	0.044
AVG	1.259	0.043	AVG	0.050	0.051
TARE	1.000	0.016	TARE	0.024	0.013

Table B27 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

	X	Y	Z
PROBE COORDINATES:	-0.39 R	-0.90 R	0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.155	0.025
1	1.149	0.025
2	1.149	0.026
3	1.142	0.028
4	1.140	0.025
5	1.134	0.027
6	1.135	0.025
7	1.138	0.025
8	1.141	0.028
9	1.141	0.029
10	1.143	0.025
11	1.138	0.025
12	1.141	0.025
13	1.139	0.028
14	1.135	0.025
15	1.137	0.025
16	1.137	0.025
17	1.137	0.027
18	1.138	0.025
19	1.138	0.027
20	1.135	0.026
21	1.134	0.028
22	1.135	0.028
23	1.131	0.027
24	1.131	0.023
25	1.132	0.024
26	1.133	0.027
27	1.138	0.027
28	1.138	0.026
29	1.135	0.031
30	1.135	0.023
31	1.134	0.025
32	1.138	0.026
33	1.139	0.028
34	1.141	0.031
35	1.149	0.026
36	1.149	0.029
37	1.150	0.025
38	1.146	0.026
39	1.145	0.028
40	1.148	0.027
41	1.154	0.029
42	1.153	0.031
43	1.155	0.033
44	1.159	0.031
45	1.156	0.036
46	1.156	0.035
47	1.153	0.035
48	1.142	0.051
49	1.123	0.067
50	1.114	0.076
51	1.079	0.094
52	1.057	0.130
53	1.083	0.146
54	1.122	0.161
55	1.217	0.152
56	1.251	0.143
57	1.287	0.126
58	1.344	0.098
59	1.381	0.119
60	1.421	0.108
61	1.463	0.100
62	1.498	0.111
63	1.522	0.090
64	1.539	0.089
65	1.525	0.085
66	1.534	0.083
67	1.530	0.086
68	1.507	0.090
69	1.475	0.089
70	1.433	0.075
71	1.368	0.078
72	1.363	0.074
73	1.333	0.065
74	1.302	0.059
75	1.281	0.045
76	1.256	0.045
77	1.234	0.040
78	1.219	0.040
79	1.219	0.035
80	1.205	0.031
81	1.195	0.033
82	1.185	0.029
83	1.178	0.030
84	1.171	0.027
85	1.169	0.031
86	1.164	0.027
87	1.160	0.027
88	1.160	0.025
89	1.156	0.029
AVG	1.209	0.059
TARE	0.999	0.016

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.128	0.039
1	0.110	0.039
2	0.114	0.039
3	0.111	0.043
4	0.103	0.035
5	0.091	0.036
6	0.097	0.040
7	0.035	0.042
8	0.075	0.041
9	0.073	0.039
10	0.073	0.045
11	0.058	0.037
12	0.049	0.037
13	0.051	0.042
14	0.035	0.033
15	0.045	0.043
16	0.033	0.047
17	0.028	0.038
18	0.022	0.035
19	0.013	0.036
20	0.007	0.043
21	-0.001	0.040
22	-0.007	0.043
23	-0.008	0.033
24	-0.024	0.035
25	-0.026	0.040
26	-0.020	0.030
27	-0.038	0.043
28	-0.044	6.040
29	-0.052	0.043
30	-0.067	0.039
31	-0.073	0.038
32	-0.073	0.030
33	-0.098	0.042
34	-0.103	0.041
35	-0.105	0.047
36	-0.111	0.043
37	-0.119	0.044
38	-0.131	0.037
39	-0.147	0.044
40	-0.153	0.044
41	-0.166	0.043
42	-0.180	0.043
43	-0.196	0.042
44	-0.206	0.051
45	-0.213	0.052
46	-0.225	0.050
47	-0.247	0.034
48	-0.245	0.109
49	-0.256	0.131
50	-0.228	0.132
51	-0.172	0.122
52	-0.106	0.147
53	-0.055	0.127
54	-0.002	0.084
55	0.012	0.067
56	0.011	0.062
57	-0.002	0.049
58	0.005	0.063
59	0.010	0.059
60	0.043	0.074
61	0.056	0.071
62	0.117	0.095
63	0.137	0.091
64	0.181	0.097
65	0.225	0.082
66	0.271	0.094
67	0.300	0.081
68	0.321	0.088
69	0.323	0.079
70	0.326	0.073
71	0.312	0.060
72	0.309	0.063
73	0.301	0.033
74	0.287	0.049
75	0.271	0.047
76	0.267	0.046
77	0.252	0.043
78	0.251	0.049
79	0.243	0.047
80	0.230	0.048
81	0.214	0.042
82	0.197	0.043
83	0.195	0.045
84	0.189	0.045
85	0.182	0.041
86	0.171	0.048
87	0.169	0.041
88	0.146	0.046
89	0.120	0.062
AVG	0.046	0.056
TARE	-----	-----

Table B28 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X −0.39 R   Y 1.00 R   Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.024	0.024
1	1.039	0.023
2	1.023	0.020
3	1.024	0.022
4	1.029	0.021
5	1.030	0.020
6	1.037	0.022
7	1.039	0.020
8	1.044	0.020
9	1.040	0.025
10	1.043	0.019
11	1.044	0.023
12	1.043	0.021
13	1.046	0.022
14	1.047	0.021
15	1.043	0.021
16	1.039	0.020
17	1.047	0.021
18	1.045	0.022
19	1.045	0.020
20	1.044	0.019
21	1.049	0.020
22	1.047	0.019
23	1.046	0.020
24	1.046	0.022
25	1.045	0.020
26	1.044	0.019
27	1.040	0.017
28	1.042	0.019
29	1.034	0.021
30	1.029	0.021
31	1.024	0.020
32	1.023	0.020
33	1.026	0.018
34	1.029	0.019
35	1.024	0.020
36	1.024	0.019
37	1.016	0.021
38	1.010	0.021
39	1.010	0.021
40	1.004	0.022
41	0.999	0.020
42	0.994	0.022
43	0.993	0.022
44	0.979	0.025
45	0.968	0.024
46	0.959	0.025
47	0.956	0.025
48	0.945	0.027
49	0.937	0.030
50	0.923	0.031
51	0.907	0.034
52	0.895	0.040
53	0.885	0.036
54	0.871	0.041
55	0.857	0.047
56	0.836	0.049
57	0.821	0.040
58	0.811	0.051
59	0.803	0.048
60	0.791	0.055
61	0.784	0.051
62	0.769	0.067
63	0.769	0.050
64	0.770	0.059
65	0.771	0.061
66	0.777	0.058
67	0.814	0.056
68	0.827	0.058
69	0.849	0.058
70	0.850	0.058
71	0.879	0.045
72	0.896	0.043
73	0.907	0.041
74	0.922	0.057
75	0.935	0.032
76	0.949	0.030
77	0.953	0.030
78	0.966	0.031
79	0.967	0.027
80	0.963	0.027
81	0.977	0.028
82	0.994	0.024
83	0.995	0.027
84	1.006	0.026
85	1.011	0.023
86	1.014	0.023
87	1.019	0.025
88	1.024	0.022
89	1.027	0.022
AVG	0.966	0.030
TARE	-----	-----

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	−0.077	0.046
1	−0.077	0.047
2	−0.082	0.041
3	−0.067	0.053
4	−0.056	0.043
5	−0.059	0.046
6	−0.039	0.048
7	−0.027	0.052
8	0.008	0.048
9	0.027	0.050
10	0.056	0.057
11	0.067	0.060
12	0.092	0.050
13	0.122	0.055
14	0.132	0.062
15	0.154	0.049
16	0.170	0.049
17	0.188	0.047
18	0.184	0.049
19	0.195	0.050
20	0.198	0.044
21	0.200	0.049
23	0.202	0.050
24	0.205	0.045
25	0.197	0.048
26	0.193	0.047
27	0.195	0.051
28	0.177	0.047
29	0.179	0.042
30	0.173	0.041
31	0.164	0.045
32	0.170	0.048
33	0.159	0.046
34	0.155	0.045
35	0.145	0.049
36	0.146	0.047
37	0.141	0.046
38	0.138	0.040
39	0.132	0.044
40	0.137	0.060
41	0.127	0.052
42	0.116	0.055
43	0.122	0.063
44	0.123	0.054
45	0.111	0.055
46	0.107	0.054
47	0.100	0.054
48	0.092	0.058
49	0.097	0.056
50	0.089	0.062
51	0.081	0.060
52	0.080	0.069
53	0.073	0.051
54	0.063	0.055
55	0.066	0.055
56	0.055	0.053
57	0.054	0.049
58	0.061	0.042
59	0.043	0.057
60	0.042	0.052
61	0.034	0.065
62	0.032	0.052
63	0.028	0.051
64	0.022	0.064
66	0.012	0.058
67	0.012	0.051
68	0.002	0.053
69	−0.004	0.048
70	−0.006	0.056
71	−0.007	0.059
72	−0.018	0.054
73	−0.022	0.054
74	−0.033	0.051
75	−0.029	0.059
76	------	-----
77	−0.041	0.051
78	−0.053	0.051
79	−.0.52	0.047
80	−0.058	0.050
81	−0.065	0.049
82	−0.072	0.043
83	−0.076	0.039
84	−0.072	0.049
85	−0.094	0.041
86	−0.085	0.065
87	−0.093	0.040
88	−0.080	0.047
89	−0.083	0.043
AVG	0.040	0.051
TARE	-----	-----

Table B29 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

Table B30 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X −0.39 R Y 1.10 R Z 0.00 R

LONGITUDINAL COMPONENT			VERTICAL COMPONENT		
DEGREE	AVG VEL	RMS	DEGREE	AVG VEL	RMS
0	0.990	0.021	0	0.059	0.042
1	0.995	0.021	1	0.059	0.044
2	1.000	0.022	2	0.054	0.041
3	0.997	0.023	3	0.052	0.039
4	0.994	0.020	4	0.053	0.044
5	0.995	0.020	5	0.054	0.038
6	1.001	0.022	6	0.054	0.043
7	0.990	0.022	7	0.049	0.046
8	0.995	0.022	8	0.048	0.039
9	0.996	0.020	9	0.048	0.039
10	0.999	0.021	10	0.045	0.050
11	1.003	0.019	11	0.038	0.042
12	1.006	0.021	12	0.042	0.046
13	1.003	0.021	13	0.039	0.050
14	1.000	0.021	14	0.037	0.047
15	1.004	0.019	15	0.036	0.043
16	1.003	0.023	16	0.029	0.045
17	1.007	0.019	17	0.030	0.049
18	1.002	0.019	18	0.020	0.039
19	1.001	0.022	19	0.026	0.038
20	0.996	0.018	20	0.027	0.050
21	1.000	0.021	21	0.021	0.039
22	0.994	0.021	22	0.016	0.042
23	1.000	0.019	23	0.017	0.041
24	0.999	0.022	24	0.012	0.045
25	0.995	0.022	25	0.013	0.041
26	0.998	0.022	26	0.009	0.041
27	0.991	0.023	27	0.017	0.041
28	0.902	0.022	28	0.007	0.037
29	0.980	0.024	29	0.015	0.043
30	0.974	0.021	30	−0.008	0.040
31	0.976	0.022	31	0.009	0.042
32	0.988	0.023	32	0.003	0.048
33	0.991	0.023	33	−0.001	0.048
34	0.986	0.020	34	0.001	0.039
35	0.979	0.020	35	0.002	0.037
36	0.973	0.022	36	0.009	0.047
37	0.974	0.020	37	−0.001	0.043
38	0.977	0.022	38	0.004	0.044
39	0.975	0.020	39	0.001	0.044
40	0.976	0.022	40	0.001	0.040
41	0.971	0.022	41	−0.091	0.047
42	0.964	0.022	42	−0.003	0.039
43	0.963	0.022	43	−0.004	0.041
44	0.960	0.021	44	0.092	0.039
45	0.959	0.021	45	0.005	0.046
46	0.953	0.022	46	0.003	0.042
47	0.954	0.024	47	0.009	0.042
48	0.952	0.024	48	0.006	0.039
49	0.953	0.027	49	0.014	0.038
50	0.953	0.024	50	0.018	0.051
51	0.950	0.021	51	0.019	0.036
52	0.949	0.027	52	0.016	0.044
53	0.953	0.026	53	0.018	0.040
54	0.949	0.026	54	0.017	0.037
55	0.945	0.024	55	0.016	0.032
56	0.947	0.027	56	0.021	0.039
57	0.946	0.024	57	0.032	0.047
58	0.944	0.026	58	0.028	0.034
59	0.948	0.021	59	0.042	0.043
60	0.945	0.027	60	0.036	0.039
61	0.943	0.030	61	0.041	0.041
62	0.927	0.023	62	0.045	0.041
63	0.942	0.024	63	0.045	0.039
64	0.941	0.025	64	0.055	0.046
65	0.940	0.025	65	0.040	0.042
66	0.952	0.027	66	0.060	0.044
67	0.954	0.026	67	0.058	0.034
68	0.959	0.023	68	0.060	0.046
69	0.958	0.026	69	0.063	0.040
70	0.953	0.026	70	0.061	0.041
71	0.953	0.026	71	0.058	0.042
72	0.956	0.025	72	0.069	0.039
73	0.951	0.025	73	0.067	0.044
74	0.963	0.026	74	0.070	0.043
75	0.966	0.024	75	0.066	0.041
76	0.974	0.025	76	0.074	0.041
77	0.972	0.024	77	0.075	0.041
78	0.970	0.027	78	0.069	0.038
79	0.971	0.023	79	0.073	0.037
80	0.977	0.023	80	0.070	0.042
81	0.979	0.026	81	0.067	0.038
82	0.982	0.024	82	0.066	0.042
83	0.982	0.022	83	0.071	0.044
84	0.989	0.022	84	0.060	0.037
85	0.991	0.028	85	0.067	0.040
86	0.995	0.021	86	0.058	0.039
87	0.992	0.024	87	0.061	0.043
88	0.991	0.022	88	0.066	0.044
89	0.991	0.022	89	0.058	0.035
AVG	0.976	0.023	AVG	0.035	0.042
TARE	0.997	0.015	TARE	0.013	0.013

Table B31 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X 0.21 R Y 0.70 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.150	0.020
1	1.148	0.021
2	1.149	0.021
3	1.151	0.018
4	1.151	0.021
5	1.147	0.023
6	1.148	0.021
7	1.154	0.019
8	1.152	0.019
9	1.147	0.018
10	1.148	0.020
11	1.150	0.020
12	1.146	0.017
13	1.148	0.019
14	1.148	0.020
15	1.149	0.019
16	1.146	0.020
17	1.147	0.020
18	1.142	0.017
19	1.143	0.018
20	1.143	0.022
21	1.140	0.020
22	1.140	0.021
23	1.139	0.020
24	1.138	0.021
25	1.135	0.019
26	1.128	0.021
27	1.135	0.021
28	1.129	0.022
29	1.133	0.023
30	1.125	0.025
31	1.124	0.022
32	1.120	0.025
33	1.124	0.024
34	1.119	0.023
35	1.121	0.027
36	1.121	0.026
37	1.115	0.026
38	1.114	0.024
39	1.108	0.023
40	1.100	0.027
41	1.093	0.026
42	1.084	0.030
43	1.085	0.027
44	1.076	0.032
45	1.058	0.031
46	1.044	0.048
47	1.017	0.052
48	0.983	0.061
49	0.937	0.057
50	0.934	0.042
51	0.960	0.036
52	0.970	0.033
53	0.995	0.031
54	1.016	0.028
55	1.031	0.025
56	1.039	0.024
57	1.051	0.020
58	1.056	0.021
59	1.064	0.020
60	1.069	0.017
61	1.074	0.018
62	1.080	0.017
63	1.083	0.019
64	1.090	0.019
65	1.095	0.018
66	1.099	0.020
67	1.100	0.018
68	1.105	0.019
69	1.106	0.018
70	1.110	0.018
71	1.112	0.021
72	1.113	0.018
73	1.116	0.020
74	1.117	0.017
75	1.123	0.019
76	1.129	0.018
77	1.130	0.018
78	1.126	0.020
79	1.133	0.019
80	1.135	0.018
81	1.136	0.018
82	1.137	0.021
83	1.141	0.018
84	1.139	0.017
85	1.140	0.019
86	1.143	0.022
87	1.149	0.018
88	1.149	0.020
89	1.153	0.021
AVG	1.107	0.023
TARE	1.000	0.013

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	-0.017	0.032
1	-0.019	0.033
2	-0.015	0.044
3	-0.023	0.037
4	-0.016	0.044
5	-0.020	0.036
6	-0.017	0.039
7	-0.019	0.039
8	-0.025	0.032
9	-0.017	0.038
10	-0.016	0.040
11	-0.016	0.034
12	-0.019	0.032
13	-0.015	0.035
14	-0.015	0.045
15	-0.019	0.035
16	-0.020	0.035
17	-0.025	0.033
18	-0.020	0.030
19	-0.020	0.039
20	-0.015	0.035
21	-0.015	0.034
22	-0.017	0.031
23	-0.017	0.031
24	-0.017	0.033
25	-0.020	0.031
26	-0.013	0.042
27	-0.011	0.038
28	-0.018	0.038
29	-0.012	0.038
30	-0.013	0.036
31	-0.012	0.031
32	-0.014	0.031
33	-0.015	0.033
34	-0.017	0.037
35	-0.011	0.047
36	-0.008	0.036
37	-0.009	0.033
38	-0.010	0.034
39	-0.002	0.035
40	-0.006	0.037
41	-0.009	0.036
42	-0.006	0.033
43	-0.004	0.034
44	-0.004	0.032
45	0.006	0.041
46	0.003	0.039
47	0.006	0.039
48	0.010	0.039
49	0.007	0.039
50	0.014	0.039
51	0.009	0.032
52	0.021	0.034
53	0.024	0.040
54	0.024	0.040
55	0.019	0.037
56	0.018	0.039
57	0.019	0.049
58	0.015	0.033
59	0.017	0.047
60	0.015	0.047
61	0.009	0.035
62	0.010	0.037
63	0.009	0.034
64	0.009	0.033
65	0.005	0.041
66	-0.000	0.042
67	0.002	0.035
68	0.001	0.038
69	-0.004	0.027
70	-0.004	0.030
71	-0.003	0.033
72	-0.010	0.031
73	-0.006	0.041
74	-0.012	0.039
75	-0.012	0.035
76	-0.005	0.037
77	-0.004	0.033
78	-0.008	0.037
79	-0.012	0.034
80	-0.013	0.032
81	-0.019	0.032
82	-0.012	0.037
83	-0.016	0.035
84	-0.013	0.036
85	-0.016	0.035
86	-0.017	0.033
87	-0.014	0.036
88	-0.017	0.037
89	-0.023	0.032
AVG	-0.007	0.030
TARE	-----	------

	X	Y	Z
PROBE COORDINATES:	0.21 R	-0.40 R	0.00 R

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	-0.057	0.056
1	-0.055	0.046
2	-0.056	0.050
3	-0.068	0.043
4	-----	-----
5	-0.060	0.047
6	-0.052	0.051
7	-0.054	0.043
8	-0.058	0.043
9	-0.055	0.043
10	-0.050	0.051
11	-0.054	0.044
12	-0.055	0.047
13	-0.050	0.039
14	-0.043	0.037
15	-0.056	0.042
16	-0.047	0.055
17	-0.050	0.034
18	-0.049	0.045
19	-0.051	0.049
20	-0.047	0.047
21	-0.047	0.035
22	-0.052	0.034
23	-0.047	0.035
24	-0.049	0.037
25	-0.045	0.034
26	-0.040	0.041
27	-0.044	0.030
28	-0.042	0.036
29	-0.042	0.034
30	-0.038	0.038
31	-0.039	0.042
32	-0.031	0.039
33	-0.036	0.039
34	-0.035	0.031
35	-0.034	0.039
36	-0.035	0.038
37	-0.031	0.039
38	-0.035	0.039
39	-0.030	0.041
40	-0.029	0.039
41	-0.025	0.040
42	-0.017	0.040
43	-0.022	0.030
44	[illegible]	0.043
45	-0.016	[illegible]
46	-0.013	[illegible]
47	[illegible]	0.040
48	[illegible]	0.040
49	[illegible]	0.040
50	[illegible]	[illegible]
51	[illegible]	[illegible]
52	[illegible]	[illegible]
53	[illegible]	[illegible]
54	0.044	[illegible]
55	[illegible]	[illegible]
56	[illegible]	[illegible]
57	[illegible]	[illegible]
58	[illegible]	[illegible]
59	[illegible]	[illegible]
60	-	-----
61	[illegible]	[illegible]
62	[illegible]	[illegible]
63	[illegible]	[illegible]
64	[illegible]	[illegible]
65	[illegible]	[illegible]
66	[illegible]	[illegible]
67	[illegible]	[illegible]
68	[illegible]	[illegible]
69	[illegible]	[illegible]
70	-0.043	[illegible]
71	-0.050	0.066
72	-0.052	0.067
73	-0.065	0.063
74	-0.051	[illegible]
75	[illegible]	[illegible]
76	-----	-----
77	-0.065	[illegible]
78	-0.060	0.066
79	-0.066	0.067
80	-0.064	0.061
81	-0.073	[illegible]
82	-0.067	[illegible]
83	-0.065	0.054
84	-0.063	0.050
85	-0.071	[illegible]
86	-0.074	0.047
87	-0.066	0.054
88	[illegible]	0.052
89	-0.071	0.044
[illegible]	[illegible]	[illegible]
TARE	-----	-----

Table B32 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

Table B33 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X 0.21 R Y -0.50 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.959	0.070
1	0.989	0.054
2	0.967	0.055
3	1.023	0.079
4	1.043	0.053
5	1.061	0.040
6	1.069	0.034
7	1.088	0.024
8	1.107	0.037
9	1.116	0.037
10	1.107	0.037
11	1.131	0.033
12	1.145	0.024
13	1.152	0.026
14	1.156	0.029
15	1.161	0.022
16	1.167	0.023
17	1.162	0.024
18	1.164	0.022
19	1.163	0.024
20	1.157	0.019
21	1.157	0.021
22	1.157	0.022
23	1.157	0.025
24	1.153	0.021
25	1.152	0.023
26	1.150	0.022
27	1.151	0.022
28	1.146	0.021
29	1.147	0.025
30	1.143	0.020
31	1.144	0.021
32	1.145	0.022
33	1.140	0.024
34	1.137	0.022
35	1.134	0.020
36	1.131	0.021
37	1.125	0.021
38	1.126	0.024
39	1.122	0.024
40	1.115	0.023
41	1.109	0.024
42	1.108	0.026
43	1.106	0.024
44	1.101	0.027
45	1.091	0.033
46	1.080	0.028
47	1.068	0.038
48	1.049	0.047
49	1.026	0.054
50	0.991	0.089
51	0.952	0.109
52	0.913	0.143
53	0.914	0.111
54	0.912	0.079
55	0.947	0.066
56	0.987	0.071
57	0.977	0.049
58	0.997	0.044
59	0.997	0.032
60	1.007	0.033
61	1.026	0.050
62	1.029	0.049
63	1.025	0.046
64	1.030	0.044
65	1.036	0.045
66	1.036	0.054
67	1.029	0.055
68	1.039	0.063
69	1.041	0.062
70	1.055	0.068
71	1.036	0.072
72	1.015	0.071
73	1.034	0.071
74	1.006	0.074
75	1.020	0.066
76	1.036	0.072
77	0.996	0.058
78	1.019	0.067
79	0.973	0.035
80	0.980	0.034
81	0.970	0.032
82	0.968	0.028
83	0.946	0.924
84	0.957	0.043
85	0.952	0.036
86	0.966	0.041
87	0.996	0.045
88	0.980	0.055
89	0.956	0.055
AVG	1.057	0.044
TARE	1.036	0.018

VERTICAL COMPONENT

DEGREES	AVG VEL	RMS
0	-0.056	0.034
1	-0.055	0.031
2	-0.058	0.030
3	-0.058	0.034
4	-0.061	0.029
5	-0.060	0.033
6	-0.060	0.028
7	-0.057	0.027
8	-0.064	0.025
9	-0.056	0.034
10	-0.059	0.030
11	-0.055	0.031
12	-0.056	0.030
13	-0.060	0.033
14	-0.059	0.026
15	-0.055	0.031
16	-0.050	0.030
17	-0.057	0.028
18	-0.056	0.032
19	-0.048	0.033
20	-0.054	0.026
21	-0.047	0.029
22	-0.048	0.031
23	-0.045	0.031
24	-0.046	0.034
25	-0.044	0.034
26	-0.047	0.032
27	-0.042	0.032
28	-0.042	0.033
29	-0.043	0.028
30	-0.044	0.031
31	-0.038	0.036
32	-0.040	0.036
33	-0.041	0.029
34	-0.047	0.031
35	-0.048	0.033
36	-0.041	0.027
37	-0.043	0.031
38	-0.043	0.030
39	-0.041	0.028
40	-0.039	0.031
41	-0.040	0.031
42	-0.041	0.032
43	-0.044	0.030
44	-0.043	0.025
45	-0.035	0.031
46	-0.037	0.026
47	-0.035	0.032
48	-0.035	0.029
49	-0.033	0.035
50	-0.034	0.029
51	-0.034	0.033
52	-0.038	0.027
53	-0.031	0.030
54	-0.039	0.028
55	-0.036	0.031
56	-0.032	0.030
57	-0.031	0.033
58	-0.039	0.032
59	-0.033	0.025
60	-0.036	0.027
61	-0.033	0.025
62	-0.035	0.027
63	-0.035	0.027
64	-0.033	0.029
65	-0.031	0.033
66	-0.029	0.032
67	-0.031	0.032
68	-0.034	0.028
69	-0.034	0.027
70	-0.033	0.029
71	-0.026	0.030
72	-0.025	0.029
73	-0.026	0.030
74	-0.024	0.031
75	-0.027	0.034
76	-0.024	0.034
77	-0.023	0.031
78	-0.018	0.036
79	-0.015	0.038
80	-0.008	0.037
81	-0.016	0.035
82	-0.022	0.032
83	-0.029	0.034
84	-0.041	0.036
85	-0.047	0.032
86	-0.043	0.034
87	-0.043	0.037
88	-0.050	0.034
89	-0.048	0.039
AVG	-0.041	0.031
TARE	-.009	0.013

Table B34 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X 0.21 R, Y -0.70 R, Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.136	0.023
1	1.139	0.021
2	1.137	0.024
3	1.142	0.023
4	1.143	0.024
5	1.145	0.023
6	1.145	0.023
7	1.142	0.022
8	1.140	0.024
9	1.140	0.019
10	1.138	0.023
11	1.139	0.023
12	1.142	0.026
13	-----	-----
14	1.142	0.020
15	1.140	0.021
16	1.138	0.021
17	1.139	0.021
18	1.136	0.023
19	1.137	0.020
20	1.141	0.023
21	1.132	0.020
22	1.132	0.021
23	1.129	0.023
24	1.132	0.022
25	1.131	0.019
26	1.125	0.020
27	1.123	0.019
28	1.124	0.021
29	1.124	0.018
30	1.121	0.029
31	1.125	0.020
32	1.118	0.019
33	1.114	0.020
34	1.110	0.020
35	1.105	0.019
36	1.103	0.019
37	1.107	0.022
38	1.100	0.020
39	1.098	0.021
40	1.102	0.024
41	1.098	0.020
42	1.098	0.023
43	1.095	0.036
44	1.095	0.037
45	1.094	0.040
46	1.078	[illegible]
47	1.059	0.052
48	1.016	0.055
49	0.987	0.068
50	0.965	0.077
51	0.999	0.079
52	1.013	0.062
53	1.032	0.049
54	1.038	0.038
55	1.037	0.031
56	1.042	0.033
57	1.054	0.031
58	1.059	0.025
59	1.035	0.026
60	1.033	0.030
61	1.061	0.031
62	1.064	0.033
63	1.064	0.035
64	1.069	0.049
65	1.075	0.040
66	1.082	0.036
67	1.083	0.039
68	1.071	0.057
69	1.082	0.056
70	1.080	0.048
71	1.076	0.067
72	1.084	0.061
73	1.087	0.062
74	1.098	0.063
75	1.089	[illegible]
76	1.123	0.027
77	1.127	0.022
78	1.130	0.024
79	1.131	0.023
80	1.132	0.022
81	1.131	0.022
82	1.137	0.022
83	1.134	0.020
84	1.132	0.023
85	1.132	0.020
86	1.132	0.023
87	1.136	0.024
88	1.136	0.023
89	1.139	0.021
AVG	1.103	0.031
TARE	1.014	0.018

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.029	0.052
1	0.028	0.041
2	0.026	0.047
3	0.037	0.059
4	0.032	[illegible]
5	0.036	[illegible]
6	0.035	0.050
7	0.033	0.047
8	0.036	0.043
9	0.041	0.059
10	-----	-----
11	0.040	0.060
12	0.045	0.070
13	0.035	0.044
14	0.035	0.045
15	0.033	0.050
16	0.040	0.048
17	0.026	0.044
18	0.024	0.030
19	0.033	0.045
20	0.027	0.049
21	0.031	0.054
22	0.029	0.044
23	0.021	0.049
24	0.024	0.045
25	0.026	0.043
26	0.023	0.047
27	0.025	0.045
28	0.028	0.052
29	0.034	0.043
30	0.030	0.040
31	0.018	0.043
32	0.023	0.045
33	0.023	0.059
34	0.022	0.055
35	0.018	0.043
36	0.029	0.037
37	0.013	[illegible]
38	0.023	0.035
39	0.015	0.037
40	0.012	0.044
41	0.007	0.042
42	0.012	0.049
43	0.010	0.031
44	0.011	0.046
45	0.010	0.054
46	0.005	[illegible]
47	0.005	0.072
48	0.002	0.070
49	-0.010	0.056
50	0.018	0.049
51	0.021	0.059
52	0.021	[illegible]
53	0.012	0.055
54	0.018	0.052
55	0.024	0.054
56	0.021	0.053
57	0.017	0.061
58	0.013	0.042
59	0.016	0.049
60	0.017	0.045
61	0.010	0.041
62	0.013	0.047
63	0.021	0.057
64	0.020	0.052
65	0.016	0.045
66	0.020	0.056
67	0.020	0.041
68	0.034	0.054
69	0.025	0.046
70	0.026	0.052
71	0.024	0.044
72	0.029	0.055
73	0.022	0.046
74	0.029	0.045
75	0.030	0.047
76	0.026	0.043
77	0.031	0.045
78	0.032	0.046
79	0.036	0.047
80	0.036	0.053
81	0.037	0.049
82	0.030	0.040
83	0.031	0.031
84	0.032	0.042
85	0.029	0.045
86	0.035	0.050
87	0.036	0.046
88	0.027	0.039
89	0.037	0.043
AVG	0.025	0.049
TARE	-.004	0.013

PROBE COORDINATES: X 0.21 R, Y -0.80 R, Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.122	0.020
1	1.125	0.021
2	1.119	0.019
3	1.120	0.020
4	1.121	0.016
5	1.122	0.021
6	1.116	0.018
7	1.117	0.020
8	1.120	0.019
9	1.124	0.018
10	1.121	0.018
11	1.120	0.018
12	1.121	0.021
13	1.121	0.016
14	1.114	0.019
15	1.116	0.022
16	1.116	0.019
17	1.115	0.020
18	1.111	0.021
19	1.112	0.018
20	1.112	0.020
21	1.111	0.018
22	1.106	0.021
23	1.106	0.020
24	1.106	0.019
25	1.104	0.020
26	1.104	0.019
27	1.103	0.021
28	1.098	0.019
29	1.098	0.017
30	1.094	0.020
31	1.090	0.018
32	1.087	0.020
33	1.087	0.017
34	1.029	0.018
35	1.084	0.021
36	1.085	0.021
37	1.078	0.015
38	1.078	0.019
39	1.076	0.019
40	1.077	0.019
41	1.073	0.022
42	1.071	0.020
43	1.067	0.021
44	1.053	0.020
45	1.062	0.024
46	1.049	0.023
47	1.030	0.026
48	1.011	0.028
49	0.994	0.029
50	0.973	0.035
51	0.936	0.034
52	0.970	0.037
53	0.906	0.035
54	1.004	0.036
55	1.021	0.030
56	1.052	0.024
57	1.039	0.022
58	1.054	0.024
59	1.056	0.026
60	1.053	0.025
61	1.073	0.019
62	1.074	0.022
63	1.080	9.023
64	1.084	0.022
65	1.088	0.019
66	1.087	0.021
67	1.091	0.020
68	1.093	0.019
69	1.095	0.022
70	1.102	0.021
71	1.105	0.024
72	1.104	0.019
73	1.099	0.018
74	1.105	0.022
75	1.100	0.023
76	1.111	0.028
77	1.112	0.022
78	1.115	0.021
79	1.116	0.021
80	1.115	0.021
81	1.115	0.021
82	1.117	0.021
83	1.116	0.021
84	1.122	0.019
85	1.123	[illegible]
86	1.124	[illegible]
87	1.121	0.019
88	1.124	0.022
89	1.121	0.020
AVG	1.088	0.021
TARE	1.007	0.015

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.043	0.043
1	0.039	0.039
2	0.043	0.046
3	0.046	0.043
4	0.053	0.056
5	0.038	0.039
6	0.041	0.054
7	0.045	0.056
8	0.039	0.039
9	0.039	0.043
10	0.046	0.045
11	0.044	0.061
12	0.034	0.047
13	0.031	0.049
14	0.033	0.038
15	0.030	0.039
16	0.040	0.050
17	0.032	0.044
18	0.031	0.037
19	0.036	0.050
20	0.035	0.043
21	0.034	0.052
22	0.038	0.040
23	0.039	0.054
24	0.022	0.036
25	0.029	0.045
26	0.029	0.043
27	0.030	0.051
28	0.034	0.052
29	0.026	0.041
30	0.027	0.045
31	0.024	0.049
32	0.023	0.041
33	0.019	0.041
34	0.025	0.054
35	0.020	0.047
36	0.023	0.044
37	0.009	0.041
38	0.015	0.043
39	0.010	0.047
40	0.002	0.041
41	0.011	0.047
42	-0.003	0.044
43	-0.000	0.049
44	-0.011	0.047
45	-0.007	0.054
46	-0.018	0.053
47	-0.013	0.055
48	-0.028	0.053
49	-0.031	0.041
50	-0.030	0.045
51	-0.008	0.050
52	-0.003	0.039
53	0.011	0.045
54	0.027	0.047
55	0.017	0.046
56	0.030	0.050
57	0.027	0.043
58	0.035	0.041
59	0.029	0.040
60	0.031	0.045
61	0.030	0.040
62	0.031	0.043
63	0.032	0.042
64	0.037	0.046
65	0.033	0.041
66	0.043	0.059
67	0.034	0.044
68	0.043	0.040
69	0.037	0.044
70	0.040	0.045
71	0.037	0.043
72	0.042	0.040
73	0.050	0.046
74	0.045	0.043
75	0.041	0.043
76	0.037	0.050
77	0.041	0.036
78	0.039	0.040
79	0.050	0.045
80	0.050	0.050
81	0.034	0.035
82	0.049	0.044
83	0.043	0.056
84	0.041	0.054
85	0.039	0.044
86	0.040	0.039
87	0.040	0.046
88	0.043	0.050
89	0.041	0.040
AVG	0.028	0.045
TARE	-.007	0.015

Table B35 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

Table B36 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X 0.21 R   Y -0.90 R   Z 0.03 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.076	0.019
1	1.077	0.019
2	1.075	0.020
3	1.078	0.017
4	1.083	0.019
5	1.085	0.018
6	1.086	0.019
7	1.085	0.020
8	1.087	0.019
9	1.088	0.019
10	1.086	0.0 8
11	1.088	0.021
12	1.090	0.018
13	1.088	0.019
14	1.085	0.017
15	1.086	0.019
16	1.085	0.021
17	1.081	0.020
18	1.082	0.015
19	1.084	0.018
20	1.082	0.017
21	1.076	0.019
22	1.091	0.019
23	1.080	0.018
24	1.092	0.019
25	1.081	0.018
26	1.082	0.018
27	1.077	0.019
28	1.071	0.018
29	1.073	0.019
30	1.071	0.019
31	1.074	0.016
32	1.073	0.020
33	1.073	0.017
34	1.071	0.018
35	1.068	0.019
36	1.066	0.019
37	1.065	0.020
38	1.063	0.018
39	1.063	0.018
40	1.059	0.016
41	1.053	0.017
42	1.052	0.019
43	1.051	0.017
44	1.049	0.017
45	1.045	0.016
46	1.046	0.018
47	1.038	0.019
48	1.033	0.016
49	1.026	0.017
50	1.018	0.018
51	1.015	0.016
52	1.013	0.020
53	1.008	0.019
54	1.004	0.022
55	1.006	0.024
56	1.014	0.020
57	1.013	0.020
58	1.023	0.020
59	1.022	0.022
60	1.024	0.022
61	1.031	0.017
62	1.041	0.020
63	1.041	0.019
64	1.046	0.019
65	1.051	0.020
66	1.054	0.019
67	1.057	0.020
68	1.061	0.019
69	1.058	0.019
70	1.059	0.020
71	1.070	0.016
72	1.071	0.021
73	1.070	0.019
74	1.072	0.020
75	1.074	0.019
76	1.077	0.017
77	1.080	0.018
78	1.077	0.020
79	1.077	0.020
80	1.068	0.019
81	1.091	0.021
82	1.084	0.019
83	1.082	0.017
84	1.085	0.019
85	1.096	0.017
86	1.083	0.020
87	1.083	0.018
88	1.070	0.016
89	1.076	0.020
AVG	1.064	0.019
TARE	1.001	0.015

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.097	0.056
1	0.094	0.050
2	0.086	0.056
3	0.094	0.051
4	0.097	0.057
5	0.090	0.060
6	0.085	0.061
7	0.093	0.060
8	0.078	0.050
9	0.075	0.056
10	0.066	0.065
11	0.085	0.053
12	0.079	0.062
13	0.086	0.063
14	0.060	0.058
15	0.076	0.057
16	0.078	0.059
17	0.075	0.054
18	0.074	0.071
19	0.080	0.062
20	0.069	0.052
21	0.069	0.057
22	0.069	0.052
23	0.068	0.053
24	0.073	0.055
25	0.073	0.060
26	0.063	0.061
27	0.080	0.057
28	0.067	0.061
29	0.059	0.043
30	0.066	0.055
31	0.060	0.056
32	0.055	0.053
33	0.058	0.058
34	0.057	0.054
35	0.054	0.053
36	0.056	0.061
37	0.056	0.068
38	0.042	0.049
39	0.046	0.055
40	0.052	0.073
41	0.048	0.056
42	0.047	0.053
43	0.044	0.057
44	0.038	0.056
45	0.029	0.046
46	0.040	0.062
47	0.043	0.073
48	0.028	0.056
49	0.038	0.056
50	0.029	0.053
51	0.029	0.057
52	0.034	0.066
53	0.038	0.063
54	0.046	0.054
55	0.051	0.053
56	0.057	0.059
57	0.061	0.060
58	0.053	0.054
59	0.056	0.044
60	0.066	0.059
61	-----	-----
62	-----	-----
63	0.084	0.055
64	0.090	0.061
65	0.084	0.052
66	0.084	0.060
67	0.081	0.053
68	0.087	0.054
69	0.093	0.062
70	0.097	0.056
71	0.053	0.055
72	0.067	0.056
73	0.085	0.059
74	0.094	0.066
75	0.094	0.072
76	0.089	0.057
77	0.092	0.064
78	0.091	0.066
79	0.093	0.060
80	0.086	0.065
81	0.080	0.056
82	0.080	0.040
83	0.097	0.050
84	0.094	0.062
85	0.091	0.053
86	0.081	0.040
87	0.091	0.055
88	0.092	0.050
89	0.090	0.065
AVG	0.070	0.059
TARE	-.011	0.017

Table B37 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X 0.21 R Y -1.10 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.021	0.015
1	1.021	0.013
2	1.023	0.016
3	1.026	0.014
4	1.029	0.014
5	1.031	0.016
6	1.032	0.017
7	1.030	0.013
8	1.027	0.016
9	1.026	0.014
10	1.028	0.013
11	1.026	0.016
12	1.023	0.014
13	1.024	0.017
14	1.028	0.015
15	1.026	0.015
16	1.029	0.014
17	1.033	0.017
18	1.028	0.015
19	1.029	0.017
20	1.034	0.017
21	1.033	0.015
22	1.027	0.014
23	1.026	0.014
24	1.030	0.016
25	1.030	0.015
26	1.028	0.017
27	1.030	0.016
28	1.031	0.013
29	1.033	0.016
30	1.033	0.013
31	1.030	0.014
32	1.028	0.016
33	1.028	0.016
34	1.027	0.017
35	1.023	0.015
36	1.021	0.015
37	1.022	0.015
38	1.024	0.013
39	1.026	0.016
40	1.027	0.016
41	1.028	0.013
42	1.029	0.015
43	1.026	0.017
44	1.021	0.016
45	1.023	0.014
46	1.021	0.014
47	1.017	0.017
48	1.019	0.016
49	1.022	0.016
50	1.021	0.013
51	1.022	0.014
52	1.020	0.017
53	1.014	0.014
54	1.017	0.016
55	1.015	0.015
56	1.015	0.016
57	1.015	0.015
58	1.011	0.017
59	1.008	0.016
60	1.009	0.016
61	1.010	0.017
62	1.011	0.017
63	1.009	0.016
64	1.009	0.015
65	1.012	0.012
66	1.011	0.015
67	1.015	0.013
68	1.015	0.017
69	1.009	0.015
70	1.006	0.015
71	1.011	0.015
72	1.010	0.015
73	1.010	0.016
74	1.012	0.014
75	1.014	0.014
76	1.014	0.017
77	1.017	0.016
78	1.020	0.015
79	1.021	0.017
80	1.019	0.015
81	1.020	0.014
82	1.020	0.017
83	1.022	0.015
84	1.017	0.018
85	1.010	0.017
86	1.009	0.013
87	1.007	0.015
88	1.016	0.014
89	1.023	0.015
AVG	[illegible]	0.015
TARE	1.000	0.013

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.064	0.030
1	0.067	0.031
2	0.065	0.035
3	0.065	0.033
4	0.067	0.037
5	0.069	0.036
6	0.063	0.034
7	0.063	0.035
8	0.066	0.035
9	0.067	0.039
10	0.068	0.036
11	0.065	0.035
12	0.066	0.034
13	0.065	0.033
14	0.065	0.033
15	0.066	0.039
16	0.063	0.032
17	0.067	0.035
18	0.059	0.034
19	0.063	0.029
20	0.061	0.034
21	0.061	0.031
22	0.060	0.034
23	0.059	0.036
24	0.055	0.030
25	0.059	0.034
26	0.055	0.032
27	0.057	0.031
28	0.059	0.034
29	0.064	0.042
30	0.061	0.039
31	0.054	0.036
32	0.053	0.029
33	0.054	0.029
34	0.049	0.031
35	0.058	0.040
36	0.052	0.033
37	0.049	0.037
38	0.050	0.035
39	0.056	0.036
40	0.056	0.039
41	0.050	0.034
42	0.051	0.034
43	0.045	0.033
44	0.042	0.033
45	0.040	0.033
46	0.047	0.035
47	0.044	0.035
48	0.040	0.036
49	0.041	0.034
50	0.043	0.034
51	0.039	0.030
52	0.042	0.033
53	0.041	0.038
54	0.042	0.035
55	0.044	0.033
56	0.035	0.030
57	0.043	0.035
58	0.041	0.034
59	0.038	0.031
60	0.039	0.035
61	0.041	0.032
62	0.042	0.039
63	0.040	0.033
64	0.043	0.031
65	0.048	0.036
66	0.053	0.033
67	0.045	0.030
68	0.044	0.030
69	0.050	0.032
70	0.058	0.034
71	0.051	0.035
72	0.052	0.032
73	0.057	0.028
74	0.058	0.035
75	0.063	0.034
76	0.056	0.032
77	0.056	0.033
78	0.058	0.037
79	0.059	0.029
80	0.067	0.035
81	0.061	0.031
82	0.065	[illegible]
83	0.065	0.032
84	0.062	0.033
85	0.063	0.031
86	0.067	0.037
87	0.062	[illegible]
88	0.062	0.038
89	0.067	0.031
AVE	0.055	0.034
TARE	-----	-----

Table B38 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X 0.21 R Y -1.00 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.041	0.017
1	1.039	0.017
2	1.040	0.016
3	1.043	0.016
4	1.042	0.020
5	1.047	0.019
6	1.045	0.018
7	1.045	0.018
8	1.047	0.020
9	1.049	0.017
10	1.053	0.017
11	1.052	0.019
12	1.052	0.018
13	1.053	0.018
14	1.052	0.017
15	1.050	0.017
16	1.052	0.020
17	1.052	0.018
18	1.054	0.020
19	1.052	0.018
20	1.050	0.016
21	1.048	0.017
22	1.045	0.017
23	1.045	0.017
24	1.049	0.020
25	1.049	0.017
26	1.044	0.016
27	1.045	0.016
28	1.044	0.016
29	1.045	0.016
30	1.042	0.019
31	1.038	0.016
32	1.038	0.016
33	1.037	0.018
34	1.039	0.019
35	1.043	0.018
36	1.046	0.017
37	1.046	0.016
38	1.043	0.019
39	1.030	0.015
40	1.040	0.018
41	1.036	0.020
42	1.035	0.019
43	1.038	0.017
44	1.029	0.016
45	1.020	0.018
46	1.034	0.017
47	1.034	0.018
48	1.032	0.018
49	1.028	0.019
50	1.025	0.016
51	1.025	0.018
52	1.021	0.020
53	1.019	0.017
54	1.019	0.017
55	1.014	0.017
56	1.009	0.018
57	1.013	0.018
58	1.016	0.020
59	1.009	0.017
60	1.009	0.017
61	1.010	0.016
62	1.012	0.018
63	1.013	0.020
64	1.012	0.021
65	1.014	0.022
66	1.019	0.017
67	1.018	0.019
68	1.015	0.019
69	1.008	0.018
70	1.019	0.019
71	1.022	0.017
72	1.017	0.018
73	1.020	0.018
74	1.029	0.222
75	1.026	0.016
76	1.025	0.016
77	1.030	0.019
78	1.032	0.019
79	1.032	0.017
80	1.031	0.022
81	1.025	0.016
82	1.031	0.017
83	1.032	0.016
84	1.035	0.016
85	1.035	0.016
86	1.035	0.019
87	1.050	[illegible]
88	1.041	0.019
89	1.031	0.020
AVG	1.034	[illegible]
TARE	0.999	0.012

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.058	0.034
1	0.059	0.036
2	0.060	0.032
3	0.059	0.028
4	0.056	0.034
5	0.053	0.025
6	0.060	0.035
7	0.057	[illegible]
8	0.060	0.030
9	0.052	0.027
10	0.055	0.029
11	0.057	0.036
12	0.051	0.027
13	0.050	0.029
14	0.051	0.029
15	0.051	0.029
16	0.050	0.032
17	0.050	0.032
18	0.053	0.029
19	0.053	[illegible]
20	0.050	0.032
21	0.047	[illegible]
22	0.044	0.030
23	0.044	0.030
24	0.041	0.029
25	0.041	0.028
26	0.042	0.031
27	0.040	0.032
28	0.040	0.029
29	0.038	0.030
30	0.042	0.033
31	0.039	0.032
32	0.037	0.034
33	0.035	0.029
34	0.036	0.034
35	0.037	0.027
36	0.035	0.032
37	0.032	0.032
38	[illegible]	[illegible]
39	0.025	[illegible]
40	0.026	0.032
41	0.022	0.034
42	0.024	0.035
43	0.023	[illegible]
44	0.024	[illegible]
45	0.021	0.026
46	0.020	[illegible]
47	0.019	0.030
48	0.021	0.029
49	0.010	0.031
50	0.019	0.036
51	0.015	0.031
52	0.012	0.027
53	0.014	0.029
54	0.016	0.031
55	0.017	0.034
56	0.020	[illegible]
57	0.025	[illegible]
58	0.023	0.029
59	0.024	0.031
60	0.030	[illegible]
61	0.025	0.025
62	0.037	0.032
63	0.033	0.033
64	0.030	0.031
65	0.043	0.030
66	[illegible]	0.034
67	0.044	0.032
68	0.042	0.030
69	0.044	0.029
70	[illegible]	0.029
71	0.046	0.035
72	[illegible]	0.028
73	0.052	0.029
74	0.053	[illegible]
75	0.049	[illegible]
76	0.053	[illegible]
77	0.052	[illegible]
78	[illegible]	[illegible]
79	0.061	0.032
80	0.052	0.031
81	0.060	0.028
82	0.057	0.033
83	0.063	0.034
84	[illegible]	[illegible]
85	[illegible]	[illegible]
86	0.064	[illegible]
87	[illegible]	0.031
88	0.062	[illegible]
89	[illegible]	[illegible]
AVG	0.042	0.031
TARE	-----	-----

PROBE COORDINATES: X 0.21 R Y -1.22 R Z 0.00 R

LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.018	0.020
1	1.024	0.025
2	1.019	0.020
3	1.019	0.023
4	1.015	0.019
5	1.021	0.023
6	1.022	0.020
7	1.018	0.020
8	1.018	0.026
9	1.031	0.030
10	1.034	0.034
11	1.020	0.021
12	1.020	0.026
13	1.021	0.023
14	1.026	0.022
15	1.023	0.021
16	1.023	0.022
17	1.025	0.022
18	1.024	0.023
19	1.020	0.024
20	1.020	0.019
21	1.019	0.027
22	1.021	0.026
23	1.021	0.021
24	1.023	0.022
25	1.026	0.020
26	1.027	0.020
27	1.025	0.021
28	1.025	0.022
29	1.027	0.024
30	1.016	0.020
31	1.017	0.020
32	1.025	0.019
33	1.025	0.021
34	1.026	0.022
35	1.025	0.021
36	1.022	0.020
37	1.023	0.023
38	1.020	0.020
39	1.024	0.021
40	1.022	0.022
41	1.024	0.020
42	1.027	0.019
43	1.025	0.023
44	1.023	0.018
45	1.022	0.023
46	1.022	0.022
47	1.021	0.019
48	1.022	0.023
49	1.013	0.020
50	1.020	0.019
51	1.022	0.023
52	1.020	0.018
53	1.022	0.021
54	1.016	0.023
55	1.015	0.021
56	1.018	0.019
57	1.017	0.020
58	1.019	0.026
59	1.012	0.022
60	1.013	0.024
61	1.014	0.023
62	1.010	0.024
63	1.026	0.019
64	1.011	0.020
65	1.012	0.020
66	1.017	0.024
67	1.015	0.022
68	1.016	0.024
69	1.019	0.022
70	1.017	0.021
71	1.018	0.022
72	1.015	0.028
73	1.013	0.019
74	1.013	0.025
75	1.012	0.025
76	1.014	0.017
77	1.015	0.022
78	1.017	0.021
79	1.012	0.024
80	1.013	0.023
81	1.009	0.024
82	1.012	0.021
83	1.015	0.021
84	1.010	0.022
85	1.012	0.022
86	1.017	0.022
87	1.022	0.021
88	1.017	0.027
89	1.028	0.022
AVG	1.019	0.022
TARE	-----	-----

VERTICAL COMPONENT

DEGREE	AVG VEL	RMS
0	0.048	0.030
1	0.050	0.035
2	0.053	0.033
3	0.058	0.038
4	0.053	0.032
5	0.055	0.035
6	0.056	0.034
7	0.053	0.035
8	0.058	0.037
9	0.051	0.034
10	0.053	0.036
11	0.046	0.031
12	0.052	0.032
13	0.057	0.032
14	0.063	0.033
15	0.051	0.031
16	0.051	0.029
17	0.052	0.035
18	0.053	0.029
19	0.050	0.035
20	0.056	0.034
21	0.051	0.032
22	0.050	0.033
23	0.053	0.035
24	0.046	0.033
25	0.054	0.036
26	0.052	0.029
27	0.056	0.036
28	0.056	0.034
29	0.054	0.032
30	0.050	0.033
31	0.050	0.036
32	0.049	0.032
33	0.053	0.039
34	0.053	0.036
35	0.049	0.036
36	0.053	0.039
37	0.052	0.035
38	0.052	0.035
39	0.054	0.038
40	0.049	0.033
41	0.045	0.031
42	0.044	0.033
43	0.046	0.033
44	0.050	0.038
45	0.046	0.035
46	0.042	0.031
47	0.045	0.035
48	0.046	0.043
49	0.048	0.037
50	0.047	0.039
51	0.048	0.035
52	0.047	0.035
53	0.047	0.037
54	0.049	0.041
55	0.042	0.036
56	0.046	0.037
57	0.042	0.038
58	0.034	0.036
59	0.043	0.034
60	0.049	0.039
61	0.042	0.035
62	0.044	0.028
63	0.044	0.036
64	0.041	0.032
65	0.041	0.033
66	0.045	0.033
67	0.042	0.034
68	0.044	0.033
69	0.045	0.029
70	0.044	0.037
71	0.046	0.033
72	0.043	0.036
73	0.041	0.032
74	0.046	0.034
75	0.046	0.031
76	0.040	[illegible]
77	0.039	0.026
78	0.045	0.033
79	0.046	0.033
80	0.047	0.029
81	0.048	0.033
82	0.050	0.032
83	0.048	0.031
84	0.046	0.033
85	0.051	0.035
86	0.053	0.032
87	0.052	0.033
88	0.051	0.033
89	0.054	0.032
AVG	0.045	0.034
TARE	-----	-----

Table B39 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

PROBE COORDINATES: X -0.62 R   Y -0.70 R   Z 0.00 R
LONGITUDINAL COMPONENT

DEGREE	AVG VEL	RMS
0	1.265	0.025
1	1.266	0.025
2	1.264	0.024
3	1.265	0.026
4	1.263	0.025
5	1.260	0.036
6	1.259	0.026
7	1.258	0.028
8	1.255	0.024
9	1.255	0.027
10	1.255	0.025
11	1.257	0.026
12	1.253	0.025
13	1.252	0.024
14	1.251	0.024
15	1.253	0.030
16	1.250	0.023
17	1.254	0.026
18	1.255	0.028
19	1.255	0.025
20	1.253	0.029
21	1.250	0.027
22	1.251	0.030
23	1.253	0.026
24	1.256	0.027
25	1.256	0.027
26	1.257	0.023
27	1.256	0.028
28	1.260	0.027
29	1.262	0.029
30	1.266	0.029
31	1.267	0.020
32	1.267	0.027
33	1.270	0.029
34	1.274	0.032
35	1.274	0.030
36	1.276	0.029
37	1.279	0.029
38	1.284	0.032
39	1.284	0.032
40	1.269	0.033
41	1.295	0.039
42	1.299	0.033
43	1.296	0.037
44	1.295	0.033
45	1.291	0.057
46	1.268	0.067
47	1.256	0.092
48	1.251	0.079
49	1.233	0.101
50	1.234	0.106
51	1.253	0.112
52	1.270	0.110
53	1.269	0.120
54	1.305	0.099
55	1.315	0.088
56	1.334	0.072
57	1.323	0.068
58	1.329	0.055
59	1.326	0.050
60	1.320	0.044
61	1.321	0.041
62	1.314	0.033
63	1.315	0.034
64	1.313	0.031
65	1.313	0.030
66	1.307	0.025
67	1.303	0.028
68	1.305	0.023
69	1.301	0.030
70	1.300	0.028
71	1.302	0.025
72	[illegible]	0.027
73	1.293	0.028
74	1.292	0.026
75	1.292	0.024
76	1.286	0.025
77	1.287	0.020
78	1.287	0.026
79	1.283	0.026
80	1.223	0.027
81	[illegible]	0.027
82	1.278	0.022
83	1.278	[illegible]
84	1.275	[illegible]
85	1.275	0.024
86	1.278	0.034
87	1.273	0.026
88	1.270	0.026
89	[illegible]	0.020
A.S	1.277	[illegible]
TARE	-----	-----

Table B40 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position at Shaft Inclination of Zero Degrees

SHAFT INCLINATION: 0 DEGREES

PROBE COORDINATES: X 0.21 R, Y -0.33 R, Z 0.60 R

DEGREE	AVG VEL	RMS
0	-0.048	0.029
1	-0.028	0.034
2	-0.004	0.032
3	0.021	0.031
4	0.029	0.025
5	0.034	0.034
6	0.047	0.025
7	0.059	0.029
8	0.056	0.024
9	0.055	0.029
10	0.062	0.027
11	0.059	0.026
12	0.063	0.026
13	0.063	0.025
14	0.068	0.029
15	0.067	0.023
16	0.067	0.028
17	0.072	0.028
18	0.063	0.030
19	0.068	0.029
20	0.064	0.025
21	0.064	0.031
22	0.065	0.026
23	0.062	0.027
24	0.060	0.027
25	0.058	0.027
26	0.054	0.026
27	0.058	0.025
28	0.057	0.027
29	0.052	0.025
30	0.055	0.026
31	0.057	0.030
32	0.060	0.030
33	0.057	0.030
34	0.059	0.027
35	0.052	0.028
36	0.052	0.029
37	0.045	0.028
38	0.050	0.029
39	0.041	0.027
40	0.043	0.024
41	0.047	0.024
42	0.043	0.030
43	0.040	0.025
44	0.039	0.027
45	0.042	0.024
46	0.045	0.029
47	0.037	0.026
48	0.040	0.023
49	0.937	0.029
50	0.032	0.028
51	0.032	0.027
52	0.028	0.030
53	0.024	0.026
54	0.021	0.028
55	0.023	0.026
56	0.022	0.027
57	0.019	0.025
58	0.023	0.022
59	0.018	0.026
60	0.021	0.031
61	0.022	0.029
62	0.019	0.028
63	0.018	0.029
64	0.007	0.028
65	0.013	0.027
66	0.015	0.028
67	0.012	0.034
68	0.007	0.027
69	0.007	0.029
70	0.001	0.029
71	0.002	0.027
72	-0.000	0.032
73	-0.002	0.029
74	-0.003	0.031
75	-0.010	0.024
76	-0.015	0.025
77	-0.007	0.026
78	-0.018	0.031
79	-0.020	0.029
80	-0.024	0.028
81	-0.021	0.028
82	-0.025	0.028
83	-0.026	0.029
84	-0.039	0.026
85	-0.037	0.028
86	-0.044	0.029
87	-0.047	0.031
88	-0.056	0.031
89	-0.060	0.031
AVG	0.026	0.028

SHAFT INCLINATION: 0 DEGREES

PROBE COORDINATES: X 0.21 R, Y -0.33 R, Z 0.30 R

DEGREE	AVG VEL	RMS
0	0.003	0.027
1	0.010	0.032
2	0.010	0.033
3	0.026	0.029
4	0.024	0.032
5	0.035	0.027
6	0.046	0.024
7	0.045	[illegible]
8	0.052	0.027
9	0.056	0.025
10	0.056	0.026
11	0.057	0.029
12	0.063	0.028
13	0.062	0.031
14	0.061	0.027
15	0.067	0.030
16	0.064	0.031
17	0.063	0.024
18	0.060	0.026
19	0.053	0.031
20	0.053	0.033
21	0.067	0.030
22	0.064	0.027
23	0.062	0.027
24	0.059	0.030
25	0.056	0.034
26	0.066	0.033
27	0.050	0.027
28	0.061	0.027
29	0.057	0.028
30	0.063	0.033
31	0.054	0.029
32	0.059	0.026
33	0.060	0.030
34	0.053	0.030
35	0.058	0.030
36	0.057	0.030
37	0.051	0.025
38	0.050	0.027
39	0.050	0.028
40	0.052	0.029
41	0.052	0.031
42	0.047	0.028
43	0.050	0.029
44	0.044	0.030
45	0.040	0.028
46	0.040	0.030
47	0.041	0.027
48	0.040	0.029
49	0.041	0.024
50	0.034	0.028
51	0.035	0.026
52	0.039	0.030
53	0.037	0.028
54	0.036	0.028
55	0.033	0.033
56	0.030	0.028
57	0.038	0.032
58	0.028	0.025
59	0.026	0.032
60	0.031	0.031
61	0.027	0.029
62	0.025	0.028
63	0.028	0.026
64	0.022	0.026
65	0.023	0.031
66	0.024	0.029
67	0.020	0.030
68	0.016	0.030
69	0.015	0.031
70	0.008	0.030
71	0.015	0.026
72	0.009	0.027
73	0.010	0.026
74	0.007	0.030
75	0.004	0.028
76	0.005	0.026
77	0.004	0.028
78	0.001	0.032
79	0.006	0.031
80	0.003	0.030
81	0.005	0.029
82	-0.004	0.029
83	-0.004	0.028
84	0.000	0.027
85	-0.006	0.029
86	-0.002	0.028
87	-0.011	0.027
88	-0.003	0.030
89	-0.006	0.028
AVG	0.035	0.029

Table B41 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position

Table B42 - Computer Output of Velocity and RMS Velocity Data vs. Blade Angular Position

SHAFT INCLINATION: 0 DEGREES

PROBE COORDINATES: X -0.30 R, Y -0.25 R, Z 0.50 R

DEGREE	AVG VEL	RMS
0	-0.073	0.076
1	-0.092	0.076
2	-0.094	0.075
3	-0.086	0.052
4	-0.053	0.042
5	-0.060	0.070
6	-0.065	0.034
7	-0.055	0.029
8	-0.056	0.031
9	-0.057	0.072
10	-0.055	0.070
11	-0.055	0.029
12	-0.048	0.032
13	-0.044	0.036
14	-0.045	0.036
15	-0.043	0.030
16	-0.046	0.035
17	-0.037	0.032
18	-0.040	0.033
19	-0.040	0.032
20	-0.028	0.030
21	-0.037	0.035
22	-0.035	0.024
23	-0.026	0.025
24	-0.037	0.034
25	-0.033	0.032
26	-0.026	0.031
27	-0.035	0.034
28	-0.028	0.032
29	-0.035	0.032
30	-0.025	0.031
31	-0.020	0.035
32	-0.026	0.033
33	-0.053	0.031
34	-0.029	0.030
35	-0.024	0.025
36	-0.025	0.033
37	-0.021	0.037
38	-0.020	0.035
39	-0.022	0.026
40	-0.018	0.035
41	-0.018	0.035
42	-0.026	0.023
43	-0.017	0.040
44	-0.016	0.034
45	-0.021	0.037
46	-0.023	0.036
47	-0.026	0.034
48	-0.031	0.035
49	-0.029	0.036
50	-0.030	0.035
51	-0.034	0.034
52	-0.035	0.037
53	-0.031	0.038
54	-0.036	0.037
55	-0.038	0.033
56	-0.042	0.038
57	-0.045	0.035
58	-0.043	0.032
59	-0.046	0.043
60	-0.041	0.038
61	-0.045	0.038
62	-0.046	0.039
63	-0.049	0.032
64	[illegible]	0.031
65	[illegible]	0.039
66	-0.058	0.032
67	-0.060	0.036
68	-0.058	0.038
69	-0.062	0.038
70	-0.066	0.039
71	-0.076	0.030
72	-0.076	0.041
73	-0.077	0.033
74	-0.085	0.036
75	-0.086	0.036
76	-0.097	0.037
77	-0.099	0.044
78	-0.105	0.038
79	-0.107	0.038
80	-0.112	0.039
81	-0.111	0.040
82	-0.121	0.041
83	-0.124	0.036
84	-0.124	0.039
85	-0.125	0.043
86	-0.125	0.059
87	-0.115	0.088
88	-0.081	0.078
89	-0.064	0.054
AVG	-0.054	0.038

SHAFT INCLINATION: 0 DEGREES

PROBE COORDINATES: X -0.30 R, Y 0.25 R, Z 0.50 R

DEGREE	AVG VEL	RMS
0	-0.031	0.035
1	-0.024	0.038
2	-0.020	0.039
3	-0.021	0.042
4	[illegible]	0.040
5	-0.041	0.039
6	-0.046	0.037
7	-0.041	0.039
8	-0.052	0.029
9	-0.057	0.037
10	-0.165	0.039
11	-0.163	0.045
12	-0.193	0.055
13	-0.153	0.068
14	[illegible]	0.076
15	-0.078	0.086
16	-0.087	0.110
17	-0.157	0.115
18	-0.053	0.112
19	-0.096	0.123
20	-0.080	0.101
21	-0.071	0.084
22	-0.039	0.077
23	-0.014	0.078
24	0.010	0.072
25	0.041	0.072
26	0.039	0.076
27	0.054	0.061
28	0.094	0.055
29	0.097	0.053
30	0.104	0.045
31	0.114	0.051
32	0.094	0.046
33	0.101	0.037
34	0.098	0.039
35	0.099	0.043
36	0.081	0.039
37	0.082	0.042
38	0.080	0.041
39	0.075	0.034
40	0.065	0.038
41	0.056	0.035
42	0.063	0.037
43	0.063	0.034
44	0.049	0.033
45	0.052	0.040
46	0.046	0.037
47	0.043	0.039
48	0.035	0.033
49	0.042	0.032
50	0.042	0.040
51	0.033	0.039
52	0.027	0.033
53	0.030	0.034
54	0.027	0.034
55	0.027	0.035
56	0.016	0.033
57	0.018	0.037
58	0.015	0.032
59	0.018	0.035
60	0.002	0.033
61	0.007	0.034
62	0.009	0.036
63	0.003	0.032
64	0.002	0.032
65	-0.009	0.033
66	-0.003	0.037
67	-0.010	0.029
68	-0.014	0.040
69	0.022	0.033
70	0.017	0.033
71	0.011	0.033
72	0.018	0.038
73	0.011	0.033
74	0.011	0.040
75	-0.003	0.034
76	0.010	0.033
77	-0.001	0.031
78	-0.000	0.031
79	-0.003	0.033
80	0.004	0.032
81	0.001	0.042
82	-0.006	0.034
83	-0.009	0.036
84	-0.013	0.033
85	-0.011	0.036
86	-0.012	0.037
87	-0.018	0.038
88	-0.019	0.036
89	-0.019	0.043
AVG	0.008	0.046

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